MTR Corporation Limited

Kwun Tong Line Extension (KTE)

Final Environmental Monitoring and Audit Report – Part 2

Verified by: 

Position: Independent Environmental Checker

Date: 20 Oct 2017

MTR Corporation Limited

Kwun Tong Line Extension (KTE)

Final Environmental Monitoring and Audit Report – Part 2

Certified by: _____

(Felice Wong)

Position: Environmental Team Leader

Date: 20 OCT 2017

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EXECUTIVE SUMMARY

The Kwun Tong Line Extension (KTE) Project was awarded to the respective contractors in late May 2011. The EM&A programme for the Kwun Tong Line Extension (KTE) Project commenced on 20 June 2011, the commencement date of construction of the Project.

The passenger service of the KTE has been commenced on 23 October 2016. As all the KTE related works have been completed under Contract 1002 for the Whampoa Area in September 2017, this final Environmental Monitoring and Audit (EM&A) Report Part 2 presented the results of EM&A works and the construction impact monitoring during June 2011 to September 2017.

In view of completion of construction works that have the potential to cause significant environmental impact for Contract 1002, all relevant dust and noise monitoring works have been terminated on or before 30 September 2017 and approved by EPD on 6 October 2017.

No exceedance recorded for the dust monitoring.

For noise monitoring, 7 nos. of noise exceedance to the limit level and 2 nos. of exceedance to the residual level were recorded during the rock excavation works in Whampoa area. Relevant actions have been taken by the contractor to control the noise impact in accordance with the recommendations in EIA and EM&A manual.

There was no successful environmental prosecution in the reporting period of June 2011 to September 2017.

Site inspections were conducted by the Environmental Team on a weekly basis to monitor proper implementation of environmental pollution control and mitigation measures for the KTE Project.

There was one non-compliance identified in August 2014 regarding the not satisfactory follow up actions taken to handle the wastewater from construction site.

An Environmental Permit (EP-399/2010/D), which is being used for the KTE Project, was granted by EPD dated 16 February 2016.

1 INTRODUCTION

1.1 Project Background

MTR Corporation Limited (MTRCL) proposes to build a new railway line, the Kwun Tong Line Extension (KTE), otherwise referred to as 'the Project', which is an extension of the existing Kwun Tong Line from Yau Ma Tei Station to Whampoa area. The route length of the fully underground KTE is approximately 2.6 km with two new stations namely Ho Man Tin Station (HOM) and Whampoa Station (WHA), and a new ancillary ventilation building at Wylie Road.

1.2 Project Programme

The Kwun Tong Line Extension (KTE) Project was awarded to the respective Contractors Nishimatsu Construction Co. Ltd (NCC) and Chun Wo-Hip Hing Joint Venture (CHJV) for construction in late May 2011. The commencement of construction was on 20 June 2011. All the construction works for the railway operation have been completed and the passenger service for KTE has been commenced on 23 October 2016.

NCC, as the Contractor of Contract 1001, is responsible for the construction of alignment link from the existing Yau Ma Tei Station to Wuhu Street at Whampoa and the new Ho Man Tin Station as well as the ancillary ventilation building at Wylie Road. CHJV, as the Contractor of Contract 1002, is responsible for the construction of the underground Whampoa Station and a platform & overrun tunnel.

1.3 Coverage of the Final EM&A Report – Part 2

The EM&A programme for the Kwun Tong Line Extension (KTE) Project commenced on 20 June 2011. In considering the completion of construction works of contract 1002 in Whampoa area, this Final EM&A Report is prepared to present the results of EM&A works and the impact monitoring for the construction works undertaken by contractors during the period of June 2011 to September 2017. The Final EM&A Report – Part 1 covering the area of Contract 1001 has been submitted and attached in Appendix F for ease of reference.

2 PROJECT INFORMATION

2.1 Project Management Organization and Contact Details

The KTE Project organization chart is presented in Figure 1. Contacts of key environmental personnel of the Project are shown in Tables 1a and 1b respectively.

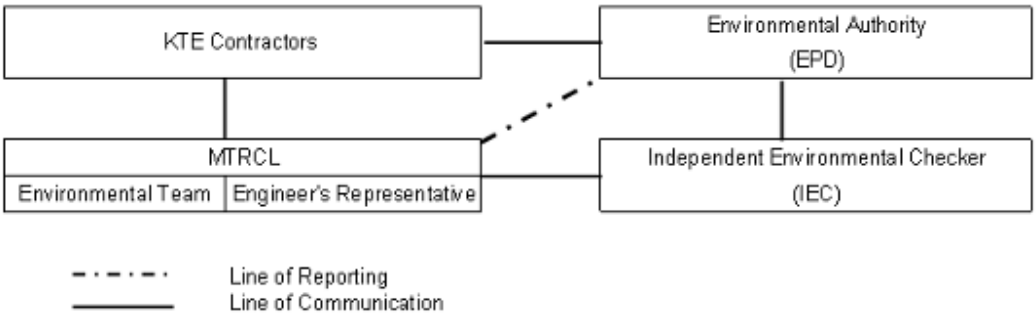


Figure 1. Project Organization

Table 1a Contact List of Key Personnel for Project Management

Organization	Name	Telephone
Engineer's Representative		
Construction Manager	Oscar Wong	3462 9638
Independent Environmental Checker		
Consultant – Arup	Jacky Chan	3447 6292
Environmental Team		
Environmental Team Leader	Felice Wong	2688 1760
Contact 1002 Contractor		
Deputy Project Manager	Paul Chan	3509 4117

Table 1b Contact List of Environmental Authority

Organization	Name	Telephone
Environmental Protection Department		
Sr Env Protection Offr(Metro Assessment) 2	Queenie Ng	2835 1129
Sr Env Protection Offr(Regional E) 6	PS Ng	2150 8002
Sr Env Protection Offr(Regional E) 5	Alfred Ng	2117 7538
Sr Env Protection Offr(Regional E) 4	Aaron Lui	2117 7502

2.2 Project Works Sites and Areas and Environmental Monitoring Locations

The KTE Project works sites and areas are summarized in Table 2 below and shown in Appendix A Figures 1, 4, 8 and 10. The locations of environmental monitoring stations are indicated in Appendix A Figures 4 and 8. Table 3 shows the details of the active

monitoring stations as reported in Sections 3.1 and 3.2.

Table 2 Summary of KTE Project Works Sites and Areas for Contract 1002

Contract 1002 Works Sites and Areas	
Works Site H	Whampoa Station West Concourse
Works Site I	Whampoa Station East Concourse
Works Area L	Hung Lok Road Site Office

Table 3 Summary of Impact Air Quality and Noise Monitoring Stations for Contract 1002

ID	**Monitoring Station**
Air	
CD4a	Ka Fu Building, Whampoa Estate
CD5	Fung Kei Millennium Primary School
Noise	
CN7	Block Y, Ki Fu Building, Whampoa Estate
CN8	Block I, Lok Wah Building, Whampoa Estate
CN9	Block 13, Bauhinia Mansions, Whampoa Garden Site 11
CN10	Block 1, Oak Mansions, Whampoa Garden Site 5
CN11	Fung Kei Millennium Primary School
CN12	GCEPSA Whampoa Primary School

2.3 Summary of EM&A Requirements

The EM&A programme mainly requires environmental monitoring for air quality, noise, landscape and visual, water quality and waste management as specified in the EM&A Manual.

A summary of impact EM&A requirements as applicable to this EM&A Report is presented in Table 4 below.

Table 4 Summary of Impact EM&A Requirements

Parameters	Descriptions	Locations	Monitoring Frequencies	Duration
Air Quality	24-hr TSP	Shown in Table 3	Once per 6 days	Construction stage
Noise	$L_{eq(30min)}$	Shown in Table 3	Once a week	Construction stage
Landscape and visual	On-Site Audit	Active Works Sites	Bi-weekly	Construction stage
Waste	On-Site Audit	Active Works Sites	Weekly	Construction stage
Wastewater	On-Site Audit	Active Works Sites	Weekly and in accordance to the discharge licences	Construction stage
General Site Conditions	Environmental Site Inspection	Active Works Sites	Weekly	Construction stage

Environmental Quality Performance Limits for air quality and noise are shown in Appendix B. The Event Action Plan for air quality and noise are shown in Appendix C.

2.4 Implementation of Environmental Mitigation Measures

The KTE Civil Works Contractors are required to implement the mitigation measures as specified in the EP, EIA Report and EM&A Manual. During the regular environmental site inspections, the Contractors' implementation of mitigation measures were inspected and reviewed. A schedule of the implementation of mitigation measures identified in the KTE EIA is given in Appendix D.

2.5 Construction Activities in the Last Reporting Month

Major construction activities carried out by the Civil Contractor in the last reporting period (1 to 30 September 2017) include:

Contract 1002 - Works Sites and Areas

Works Site H (Whampoa Station West Concourse)
- Remaining road works and landscaping works

Works Site I (Whampoa Station East Concourse)
- All works related to KTE project completed

Works Area L (Hung Lok Road Site Office)
- All works related to KTE project completed

3 IMPACT MONITORING

3.1 Air Quality

24-Hour TSP Levels Monitoring

The sampling procedure follows that described in the App. B of Pt 50 in 40CFR Ch.1 (U.S. Environmental Protection Agency). TSP is sampled by drawing air through a conditioned, pre-weighed filter paper inside the high volume sampler at a controlled rate. After 24-hour sampling the filter paper with retained particles is collected and returned to the laboratory for drying in a desiccator followed by weighing. TSP levels are calculated from the ratio of the mass of particulate retained on the filter paper to the total volume of air sampled.

The samplers should be properly maintained. Prior to dust monitoring commencing, appropriate checks should be made to ensure that all equipment and necessary power supply are in good working condition.

Calibration Requirements

The flow rate of the high volume sampler with mass flow controller will be calibrated using an orifice calibrator. Initial calibration (five points) will be conducted upon installation and prior to commissioning. Calibration will be carried out every six months.

Monitoring Results

To examine the construction dust levels, 24-hour TSP monitoring was undertaken according to the EM&A Manual. The dust monitoring locations are shown in the Section 2.2 above.

The statistical analyses of air quality monitoring data for these monitoring stations within the reporting periods are summarized in Table 5 below and the main construction activities in the reporting period and monitoring results are presented in Appendix E as graphical plot.

Table 5 Summary of 24-Hour TSP Levels Monitoring Results

Number of measurement	Average (μg/m3)	Maximum (μg/m3)	Minimum (μg/m3)	Action Level (μg/m3)	Limit Level (μg/m3)
CD4a - Ka Fu Building, Whampoa Estate					
356	75.2	184.7	14.3	187	260
CD5 - Fung Kei Millennium Primary School					
331	66.4	170.2	11.3	168	260

No exceedance was recorded for CD4a and CD5.

3.2 Noise

B&K 2250 sound level meters which complied with the International Electrotechnical Commission Publication 651:1979 (Type 1) and 804:1985 (Type 1), specification as referred to in the Technical Memoranda to the NCO were used for the construction noise impact monitoring. The B&K sound level meter and B&K 4231 calibrator are verified by the certified laboratory or manufacturer in biennial basis and annual basis respectively to ensure they perform to the same level of accuracy as stated in the manufacturer's specifications.

Immediately prior to and following each set of measurements at any NSR, the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. If the calibration levels before and after the measurement differs by more than 1.0dB the measurement shall be repeated to obtain a reliable result. Periods of prolonged or repeated overloading of the sound level meter detector were avoided by setting the meter with adequate headroom prior to commencing measurements. Measurements were recorded to the nearest whole dB, with values of 0.5 or more being rounded up.

Impact noise monitoring of $L_{Aeq(30min)}$ was undertaken to measure construction noise levels in accordance with the EM&A Manual. The noise monitoring locations are shown in Section 2.2 above.

The statistical analysis of noise monitoring data for these monitoring stations within the reporting period are summarized in Table 6 below and the major construction activities in the reporting period and monitoring results are presented in Appendix E as graphical plot.

Table 6 Statistical Analysis of Noise Monitoring Data

Number of measurement	Average (dBA)	Maximum (dBA)	Minimum (dBA)	Limit Level (dBA)	Residual Level (dBA)
CN7 - Block Y, Ki Fu Building, Whampoa Estate					
333	67	82	53	75	83
CN8 - Block I, Lok Wah Building, Whampoa Estate					
333	69	75	51	75	81
CN9 - Block 13, Bauhinia Mansions, Whampoa Garden Site 11					
311	69	79	45	75	79
CN10 - Block 1, Oak Mansions, Whampoa Garden Site 5					
315	70	82	54	75	82
CN11 - Fung Kei Millennium Primary School					
311	66	79	51	70	78
CN12 - GCEPSA Whampoa Primary School					
318	64	78	49	70	76

Monitoring Station	No. of exceedance to Limit Level	No. of exceedance to Residual Level
CN7	1	0
CN8	0	0
CN9	2	0
CN10	2	0
CN11	0	1
CN12	2	1

3.3 Action taken in Event of Exceedance

For noise monitoring, noise exceedance were recorded during the rock excavation works in East / West Concourses and Wan Hoi Street Shaft. Relevant actions have been taken by the contractors to control the noise impact in accordance with the recommendations in EIA and EM&A manual. No other noise exceedance was recorded after the completion of rock excavation works. The exceedance cases were reported in respective EM&A reports.

3.4 Noise Commissioning Test

Operational fixed plant noise and ground-borne noise commissioning test were conducted before KTE operation in accordance with EM&A Manual requirement. All commissioning test results comply with relevant criteria. The Operation Ground-borne Noise Performance Test Report and Noise Audit Report to Confirm the Compliance of Design of Fixed Plant Noise Source were approved by EPD on 6 September 2016 and 4 October 2016 respectively. For the Fixed Plant Noise Source under SCL project at Ho Man Tin Station, the noise audit would be conducted before the commencement of SCL project and submit for approval in accordance with EP Condition.

4 LANDSCAPE AND VISUAL

4.1 Monitoring Requirements

Monitoring of the implementation of the landscape and visual mitigation measures during construction phase was conducted in accordance with the requirements as stipulated in the EM&A Manual.

The landscape and visual monitoring and audit had been conducted once every two weeks throughout the construction stage.

4.2 Audit Results

Monitoring and audit was undertaken in accordance with the EM&A Manual.

The Registered Landscape Architect of Environmental Team or his representatives conducted landscape and visual audits for implementation of the landscape and visual mitigation measures during construction phase. No non-compliance was identified in the reporting period.

5 WASTE MANAGEMENT

Mitigation measures on waste management had been implemented in accordance with the requirements of the EM&A Manual. Suitable C&D materials were reused on-site while the remaining C&D materials and non-inert wastes were disposed at the public filling reception facilities and the landfills respectively. The quantities disposed during construction period of KTE Contract 1002 are summarized in the following table:

Table 7 Statistics of Wastes Disposal from KTE

Amount of Construction Wastes Disposed				
Reporting Period	Inert C&D Materials to Public Fill (m^3)	Inert C&D Materials Reused (m^3)	Non-inert Waste to Landfill (m^3)	Chemical Waste to designated treatment facility (trips)
Contract 1002				
Jun -Dec 2011	3037	0	9	0
Jan-Dec 2012	14484	68	252	5
Jan – Dec 2013	45017	60	127	0
Jan – Dec 2014	204647	6826	211	1
Jan – Dec 2015	48684	376	11719	2
Jan – Dec 2016	1219	494	4544	0
Jan – Sep 2017	492	270	270	0
Total	317580	8094	17132	8

6 WATER QUALITY

Monitoring of the implementation of the water quality mitigation measures during construction phase was conducted in accordance with the requirements as stipulated in the EM&A Manual.

Weekly site inspection was conducted throughout the construction stage covering the entire project site areas to ensure the recommended mitigation measures are properly implemented.

In the reporting period, the water quality mitigation measures were implemented in accordance with the requirements as stipulated in the EM&A Manual and found in an acceptable manner.

7 RECORD OF ENVIRONMENTAL COMPLAINTS

Total 23 cases of environmental complaints were received in the reporting period for Contract 1002 areas. 17 of them are classified as invalid and 6 of them are classified as valid complaints after investigations. The complaints had been handled in accordance with the requirements specified in the EM&A Manual. The ET had provided feasible solutions to the ER and Contractors in mitigating the environmental disturbances/concerns lodged by the complainants. All complaint cases had been resolved

and closed. Details of the environmental complaints including investigation and follow-up actions can be referenced in the respective Monthly EM&A Reports. A complaint summary for Contract 1002 is shown in below tables.

Reporting Period	Invalid Complaint			
	Contract	**Frequency**	**Nature**	**Status**
Mar 12	1002	1	Dust	Closed
Apr 12	1002	1	Noise	Closed
May 12	1002	1	Water	Closed
Aug 12	1002	2	Noise and Odour	Closed
Oct 12	1002	1	Noise	Closed
Nov 12	1002	2	Noise and Odour	Closed
Apr 14	1002	1	Noise	Closed
Dec 14	1002	1	Odour, Noise, Water	Closed
Jan 15	1002	1	Air	Closed
Apr 15	1002	1	Air	Closed
May 15	1002	3	Noise	Closed
Jun 15	1002	1	Noise	Closed
Aug 15	1002	1	Odour	Closed
Total		**17**		

Reporting Period	Valid Complaint			
	Contract	**Frequency**	**Nature**	**Status**
Nov 11	1002	1	Dust	Closed
Feb12	1002	1	Noise	Closed
Mar 12	1002	1	Noise	Closed
Jun 12	1002	3	Noise	Closed
Total		**6**		

8 RECORD OF NON-COMPLIANCES

There was one non-compliance identified in August 2014 regarding the not satisfactory follow up actions taken to handle the wastewater from construction site. Subject to the non-compliance event, the Contractor has prepared investigation report as well as the mitigation proposal to rectify and improve the water treatment facilities to address the non-compliance.

9 NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

No summon or prosecution related to environmental issue was recorded in the construction period of KTE Contractor 1002 for Whampoa area.

10 STATUS OF STATUTORY SUBMISSIONS

10.1 Submissions required under Environmental Permit

A summary of the status of submissions required under the KTE Environmental Permit as of September 2017 is shown below:

Table 10 Summary of Submissions in accordance with EP Conditions

EP-399/2010/D Part C Clause No.	Description		Status
1.12	1	Notification of commencement of construction	Submitted on 17 May 2011
2.1	2	Establishment of ET with ET Leader	Submitted on 1 Apr2011
2.1	3	Establishment of Registered Landscape Architect	Submitted on 14 Apr 2011
2.2	4	Employment of IEC	Submitted on 1 Apr 2011 and 7 Jul 2011
2.3	5	Notification of the management organization of main construction companies and/or any form of JV	Submitted on 19 May 2011
2.4	6	Layout drawings with explanatory statement, showing Project boundary, alignment and associated work areas and works sites locations	Submitted on 10 Jun 2011 and 13 Jul 2011
2.5	7	Notification of setting up hotline to service complaints, comments, suggestions or requests for information	Submitted on 12 May 2011
3.7	8	Report any contamination hotspot(s) identified from the reconnaissance site visit to the kerosene store at Chung Hau Street	Submitted on 25 Jul 2011
5.3	9	Submission of Baseline Monitoring Report	Submitted on 4 May 2011 and 8 Jul 2011
6.2	10	Notification of Internet address to place EM&A data	Submitted on 1 Aug 2011
5.4	11	Monitoring Report for July 2011	Submitted on 12 Aug 2011
5.4	12	Monitoring Report for August 2011	Submitted on 15 Sep 2011
5.4	13	Monitoring Report for September 2011	Submitted on 17 Oct 2011
4.1	14	Review Plan for Operational Groundborne Noise	Submitted on 28 Oct 2011
5.4	15	Monitoring Report for October 2011	Submitted on 14 Nov 2011
5.4	16	Monitoring Report for November 2011	Submitted on 14 Dec 2011
5.4	17	Monitoring Report for December 2011	Submitted on 16 Jan 2012
5.4	18	Monitoring Report for January 2012	Submitted on 14 Feb 2012
4.1	19	Review Plan for Operational Groundborne Noise	Submitted on 29 Feb 2012
5.4	20	Monitoring Report for February 2012	Submitted on 14 Mar 2012
5.4	21	Monitoring Report for March 2012	Submitted on 17 Apr2012
4.1	22	Review Plan for Operational Groundborne Noise	Submitted on 27 Apr 2012
5.4	23	Monitoring Report for April 2012	Submitted on 15 May 2012
3.7	24	Further Inspection to the Kerosene Store	Submitted on 8 Jun 2012
5.4	25	Monitoring Report for May 2012	Submitted on 14 Jun 2012
2.4	26	Update of Layout drawings with explanatory statement, showing Project boundary, alignment and associated work areas and works sites locations	Submitted on 13 Jul 2012

5.4	27	Monitoring Report for Jun 2012	Submitted on 16 Jul 2012
5.4	28	Monitoring Report for Jul 2012	Submitted on 14 Aug 2012
4.9	29	Landscape and Visual Plan Part 1: Tseung Kwan O Area 137 Magazine Site	Submitted on 27 Aug 2012
5.4	30	Monitoring Report for Aug 2012	Submitted on 14 Sep 2012
5.4	31	Monitoring Report for Sep 2012	Submitted on 16 Oct 2012
4.9	32	Landscape and Visual Plan Part 1: Tseung Kwan O Area 137 Magazine Site Rev. A	Submitted on 24 Oct 2012
5.4	33	Monitoring Report for Oct 2012	Submitted on 14 Nov 2012
5.4	34	Monitoring Report for Nov 2012	Submitted on 14 Dec 2012
5.4	35	Monitoring Report for Dec 2012	Submitted on 14 Jan 2013
5.4	36	Monitoring Report for Jan 2013	Submitted on 19 Feb 2013
5.1	37	Proposal of Alternative Monitoring Locations from MTRCL	Submitted on 26 Feb 2013
5.4	38	Monitoring Report for Feb 2013	Submitted on 14 Mar 2013
5.4	39	Monitoring Report for Mar 2013	Submitted on 16 Apr 2013
5.4	40	Monitoring Report for April 2013	Submitted on 15 May 2013
5.4	41	Monitoring Report for May 2013	Submitted on 17 Jun 2013
2.1	42	Replacement of Registered Landscape Architect	Submitted on 3 Jul 2013
5.4	43	Monitoring Report for June 2013	Submitted on 15 Jul 2013
5.4	44	Monitoring Report for July 2013	Submitted on 14 Aug 2013
5.1	45	Proposal of Alternative Monitoring Locations from MTRCL	Submitted on 16 Aug 2013
5.4	46	Monitoring Report for August 2013	Submitted on 13 Sep 2013
5.4	47	Monitoring Report for September 2013	Submitted on 16 Oct 2013
5.4	48	Monitoring Report for October 2013	Submitted on 14 Nov 2013
5.4	49	Monitoring Report for November 2013	Submitted on 13 Dec 2013
5.4	50	Monitoring Report for December 2013	Submitted on 15 Jan 2014
5.1	51	Proposal for Termination of TSP Monitoring at CD6a Harbourfront Horizon	Submitted on 15 Jan 2014
5.4	52	Monitoring Report for January 2014	Submitted on 17 Feb 2014
5.4	53	Monitoring Report for February 2014	Submitted on 14 Mar 2014
4.1	54	Operational Groudborne Noise Review Plan	Submitted on 20 Mar 2014
4.2	55	Operational Groundborne Noise Review Report – Phase 1	Submitted on 20 Mar 2014
5.4	56	Monitoring Report for March 2014	Submitted on 14 Apr 2014
5.4	57	Monitoring Report for April 2014	Submitted on 19 May 2014
5.4	58	Monitoring Report for May 2014	Submitted on 16 Jun2014
5.4	59	Monitoring Report for June 2014	Submitted on 15 Jul 2014

5.4	60	Monitoring Report for July 2014	Submitted on 14 Aug 2014
2.1	61	Replacement of Registered Landscape Architect	Submitted on 28 Aug 2014
5.4	62	Monitoring Report for August 2014	Submitted on 16 Sep 2014
5.4	63	Monitoring Report for September 2014	Submitted on 16 Oct 2014
4.2	64	Operational Groundborne Noise Review Report – Phase 1 and Phase 2	Submitted on 6 Nov 2014
5.4	65	Monitoring Report for October 2014	Submitted on 14 Nov 2014
5.4	66	Monitoring Report for November 2014	Submitted on 12 Dec 2014
4.2	67	Operational Groundborne Noise Review Report – Phase 1 and Phase 2 – Resubmission	Submitted on 7 Jan 2015
5.4	68	Monitoring Report for December 2014	Submitted on 15 Jan 2015
5.4	69	Monitoring Report for January 2015	Submitted on 13 Feb 2015
5.4	70	Monitoring Report for February 2015	Submitted on 13 Mar 2015
5.4	71	Monitoring Report for March 2015	Submitted on 17 Apr 2015
5.4	72	Monitoring Report for April 2015	Submitted on 15 May 2015
5.4	73	Monitoring Report for May 2015	Submitted on 12 Jun 2015
5.4	74	Monitoring Report for Jun 2015	Submitted on 15 Jul 2015
4.9	75	Landscape and Visual Plan Part 2: Gascoigne Road Rest Garden	Submitted on 7 Aug 2015
5.4	76	Monitoring Report for Jul 2015	Submitted on 14 Aug 2015
5.4	77	Monitoring Report for Aug 2015	Submitted on 14 Sep 2015
4.9	78	Landscape and Visual Plan Part 3: Wylie Road Ancillary Building	Submitted on 24 Sep 2015
5.4	79	Monitoring Report for Sep 2015	Submitted on 15 Oct 2015
5.4	80	Monitoring Report for Oct 2015	Submitted on 13 Nov 2015
4.3	81	As-built Drawings for Noise Mitigation Measures	Submitted on 20 Nov 2015
5.4	82	Monitoring Report for Nov 2015	Submitted on 14 Dec 2015
4.9	83	Landscape and Visual Plan Part 3: Wylie Road Ancillary Building (Revision A)	Submitted on 16 Dec 2016
5.4	84	Monitoring Report for Dec 2015	Submitted on 15 Jan 2016
5.1	85	Proposal for Termination of Monitoring Station CN1 Alhambra Building and CN2 Methodist College	Submitted on 1 Feb 2016
5.4	86	Monitoring Report for Jan 2016	Submitted on 17 Feb 2016
5.4	87	Monitoring Report for Feb 2016	Submitted on 11 Mar 2016
5.1	88	Proposal of Alternative Operational Ground-Borne Noise Monitoring Location from MTRCL	Submitted on 14 Mar 2016
5.4	89	Monitoring Report for Mar 2016	Submitted on 15 Apr 2016
4.9	90	Landscape and Visual Plan Part 4: Ho Man Tin Station (HOM)	Submitted on 6 May 2016
5.4	91	Monitoring Report for Apr 2016	Submitted on 16 May 2016
4.8	92	KTE Tunnel Water-tight Liner Audit Report	Submitted on 7 Jun 2016
5.4	93	Monitoring Report for May 2016	Submitted on 15 Jun 2016
5.4	94	Monitoring Report for June 2016	Submitted on 15 Jul 2016
5.1	95	Proposal for Termination of Monitoring Station CD1a and CN3a at Methodist School	Submitted on 18 Jul 2016
4.4	96	Operational Ground-borne Noise Performance Test Report	Submitted on 25 Jul 2016
4.9	97	Landscape and Visual Plan Part 2: Gascoigne Road Rest Garden (Revision A)	Submitted on 29 Jul 2016
4.9	98	Landscape and Visual Plan Part 5: Whampoa Station (WHA)	Submitted on 4 Aug 2016
5.4	99	Monitoring Report for Jul 2016	Submitted on 12 Aug 2016
4.9	100	Landscape and Visual Plan Part 2: Gascoigne Road Rest Garden (Revision B)	Submitted on 22 Aug 2016

4.6	101	Proposal for updating Maximum Sound Power Level for Fixed Plant Noise Sources	Submitted on 26 Aug 2016
4.4	102	Operational Ground-borne Noise Performance Test Report (Revision A)	Submitted on 30 Aug 2016
4.6	103	Noise Audit Report to Confirm the compliance of Design of Fixed Plant Noise Sources	Submitted on 31 Aug 2016
1.14	104	Notification of Commencement Date of Operation of KTE	Submitted on 2 September 2016
5.4	105	Monitoring Report for Aug 2016	Submitted on 14 September 2016
1.14	106	Notification of Commencement Date of Operation of KTE	Submitted on 22 September 2016
5.4	107	Monitoring Report for Sep 2016	Submitted on 17 October 2016
5.1	108	Proposal for Termination of Dust and Noise Monitoring Stations at PolyU Ho Man Tin Student Halls of Residence, No. 238 Chatham Road and Lok Do Building	Submitted on 17 October 2016
4.9	109	Landscape and Visual Plan Part 6: Fat Kwong Street Playground – Revision A (October 2016)	Submitted on 20 October 2016
4.9	110	Landscape and Visual Plan Part 5: Whampoa Station (WHA) –Revision A (October 2016)	Submitted on 28 October 2016
5.4	111	Monitoring Report for Oct 2016	Submitted on 14 November 2016
5.1 and 5.4	112	Final Environmental Monitoring and Audit (EM&A) Report – Part 1	Submitted on 18 Nov 2016
4.9	113	Landscape and Visual Plan Part 6: Fat Kwong Street Playground – Revision B (November 2016)	Submitted on 28 Nov 2016
5.4	114	Monitoring Report for Nov 2016	Submitted on 14 Dec 2016
5.4	115	Monitoring Report for Dec 2016	Submitted on 13 Jan 2017
5.4	116	Monitoring Report for Jan 2017	Submitted on 14 Feb 2017
5.4	117	Monitoring Report for Feb 2017	Submitted on 14 Mar 2017
5.4	118	Monitoring Report for Mar 2017	Submitted on 19 Apr 2017
5.4	119	Monitoring Report for Apr 2017	Submitted on 12 May 2017
5.1	120	Proposal for Termination of Dust and Noise Monitoring at Whampoa Area	Submitted on 12 May 2017
5.4	121	Monitoring Report for May 2017	Submitted on 14 Jun 2017
5.4	122	Monitoring Report for Jun 2017	Submitted on 13 Jul 2017
5.4	123	Monitoring Report for Jul 2017	Submitted on 11 Aug 2017
5.4	124	Monitoring Report for Aug 2017	Submitted on 13 Sep 2017
5.1	125	Proposal for Termination of Dust and Noise Monitoring at Whampoa Area	Submitted on 20 Sep 2017

11 SITE INSPECTIONS

11.1 Observations

Regular site inspections led by the Engineer’s Representative and anticipated by ET and respective Contractors were undertaken in accordance with the EM&A Manual in the reporting period. The contractors' performance on environmental matters were assessed and found in an acceptable manner. The inspection findings and the associated recommendations on improvement to the environmental protection and pollution control works were raised to the contractors for reference and/ or action. It is concluded that the environmental protection and pollution control works had been implemented satisfactorily.

11.2 Other Notable Events

KTE Operation

Operation of KTE has been commenced on 23 October 2016.

IEC Site Inspections

The IEC conducted site inspection for KTE project works areas on monthly basis. Observations, if any, were noted during the site inspections and the respective Contractors had followed up the issues as identified in the site inspections in a responsible manner.

12 FUTURE KEY ISSUES

12.1 Key Issues for the Coming Month

As all the construction works that have the potential to cause significant environmental impact have been completed for areas under Contract 1002, no environmental issues would be anticipated.

12.2 Effectiveness and Efficiency of Mitigation Measures

Based on the environmental monitoring results of the reporting period, the effectiveness and efficiency of the mitigation measures implemented were found to be satisfactory. It is concluded that the environmental mitigation measures as recommended in the approved KTE Project EIA Report had been implemented satisfactorily.

12.3 Review of KTE EIA Predictions

The environmental impact hypotheses with respect to construction air quality and construction noise detailed in the KTE EIA Report had been tested throughout the construction stage of the KTE Project by the regular construction impact monitoring. The environmental impact hypotheses are found to be in order generally throughout the construction stage of the KTE Project.

Based on the findings of the regular construction impact monitoring, the validity of the KTE EIA predictions can be concluded. In conclusion, the current practices regarding the performance of the environmental management system are found to be satisfactory and should be maintained.

13 CONCLUSIONS

The passenger service of the KTE has been commenced on 23 October 2016. As all the KTE related works have been completed under both Contracts 1001 and 1002, this final Environmental Monitoring and Audit (EM&A) Report Part 2 presented the results of EM&A works and the impact monitoring for the construction works for the period of June 2011 to September 2017. The Final EM&A Report – Part 1 covering the area of Contract 1001 for the period of Jun 2011 to Oct 2016 has been submitted and attached in Appendix F for ease of reference.

In view of completion of construction works that have the potential to cause significant environmental impact for Contract 1002, all relevant dust and noise monitoring works have been proposed to be terminated on 30 September 2017 and approved by EPD on 6 October 2017.

Impact monitoring for air quality and noise were conducted in accordance with the EM&A Manual in the reporting period.

No exceedance recorded for the dust monitoring.

For noise monitoring, 7 nos. of noise exceedance to the limit level and 2 nos. of exceedance to the residual level were recorded during the rock excavation works. Relevant actions have been taken by the contractor to control the noise impact in accordance with the recommendations in EIA and EM&A manual.

There was no successful environmental prosecution in the reporting period of June 2011 to September 2017.

Site inspections were conducted by the Environmental Team on a weekly basis to monitor proper implementation of environmental pollution control and mitigation measures for the KTE Project.

There was one non-compliance identified in August 2014 regarding the not satisfactory follow up actions taken to handle the wastewater from construction site.

It is concluded from the environmental monitoring and audit works for the Kwun Tong Line Extension Project were undertaken in a responsible manner. The environmental protection and pollution control measures provided the contractors were generally acceptable apart from some minor irregularities which were rectified timely by the respective civil works contractors

Appendix A

Figures – Works Sites / Area and Location of Monitoring Station for Contract 1002

Figure 1. KTE Project Works Area

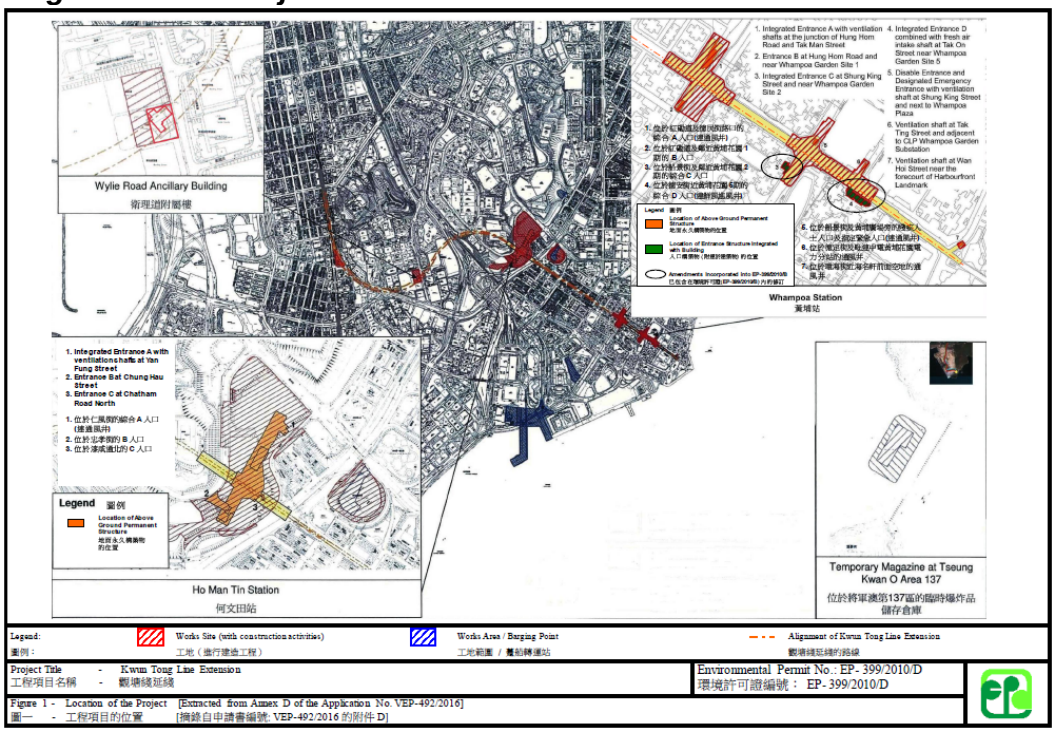


Figure 4. Location of Dust Monitoring Stations (CD4a and CD5)

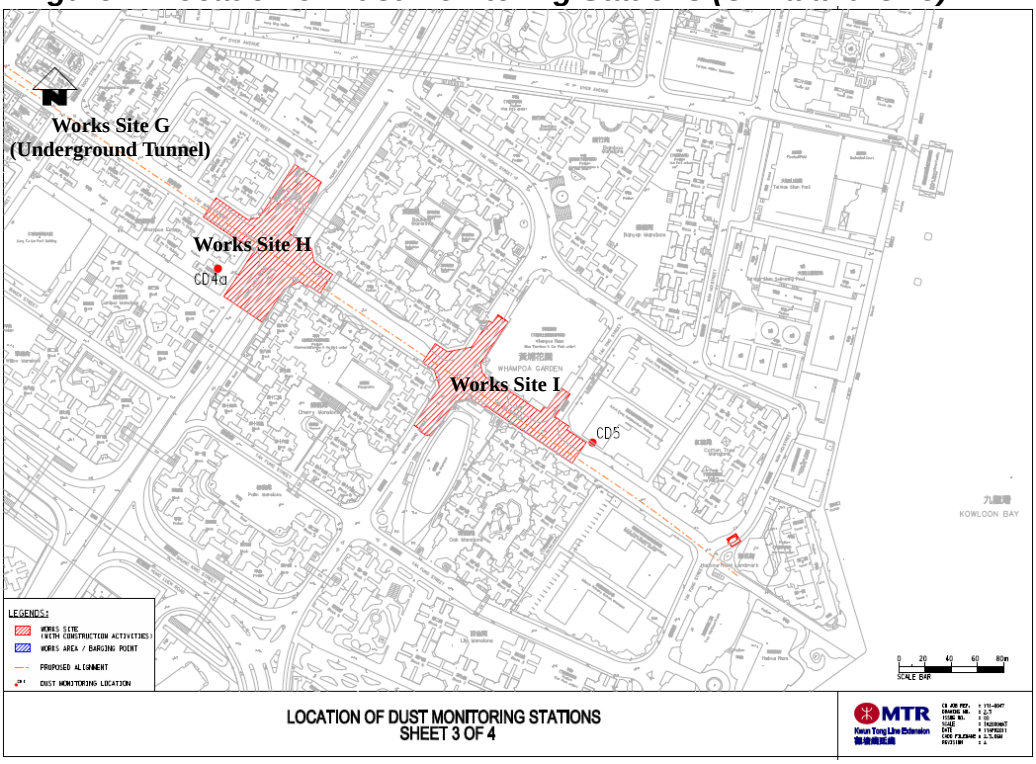


Figure 8. Location of Noise Monitoring Stations (CN7 to CN12)

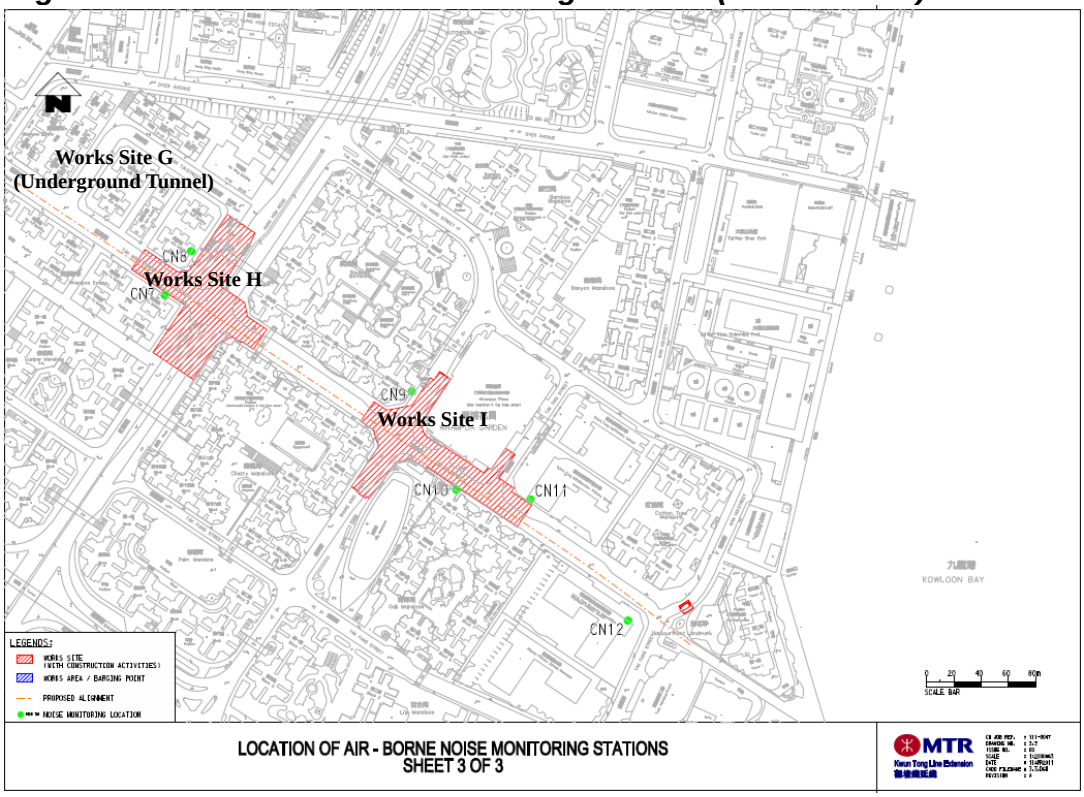
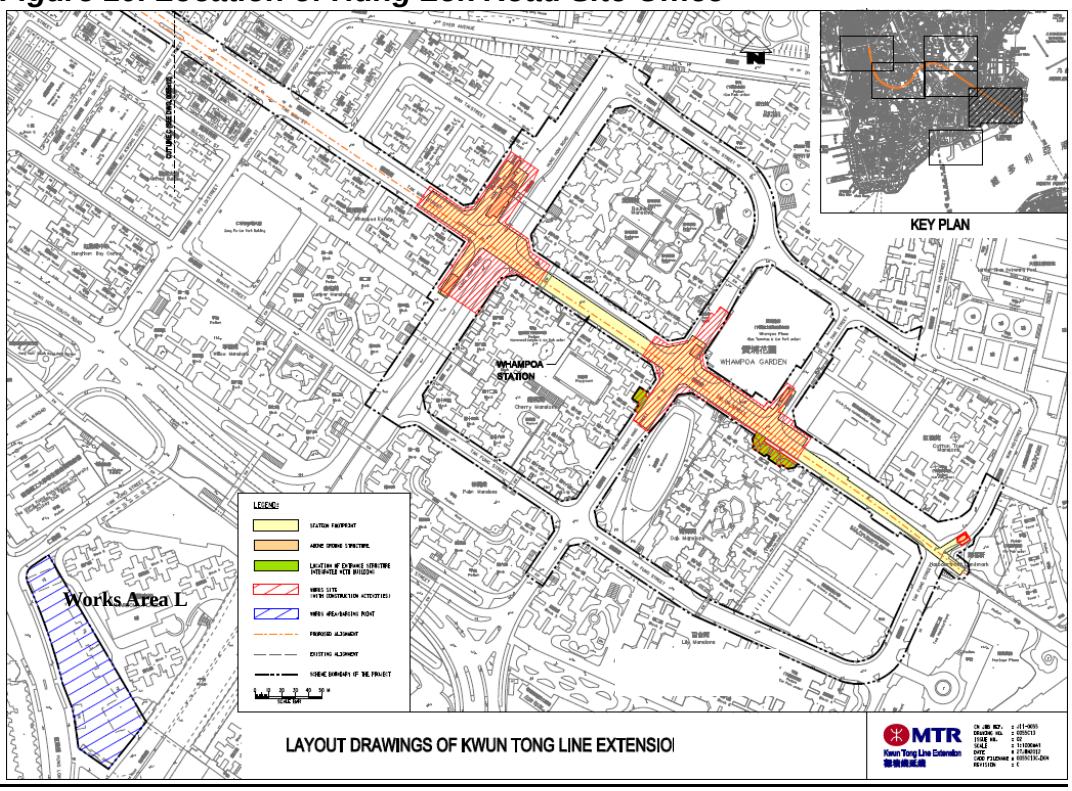


Figure 10. Location of Hung Lok Road Site Office



Appendix B

Environmental Quality Performance Limits

Action and Limit Levels for 24-hour TSP

Monitoring Station	Action Level (μg/m3)	Limit Level (μg/m3)
CD1 / CD 1a	171	260
CD2 / CD 2a	183	260
CD3a	192	260
CD4a	187	260
CD5	168	260
CD6a	182	260

Action and Limit Levels for 1-hour TSP for Complaint Handling

Monitoring Station	Action Level (μg/m3)	Limit Level (μg/m3)
CD1 / CD1a	310	500
CD2 / CD 2a	301	500
CD3a	311	500
CD4a	303	500
CD5	309	500
CD6a	316	500

Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level (dB(A)), Leq(30min)
0700-1900 hr on normal weekdays	When one documented complaint is received	75*

* Limit for school is 70 dB(A) and 65 dB(A) during school examination periods.

Appendix C

Event Action Plans

Table 4.4: Event and Action Plan for Construction Dust Monitoring

EVENT	ACTION			
	ET[1]	IEC[1]	ER[1]	Contractor
Action Level				
1. Exceedance for one sample	1. Identify sources, investigate the causes of complaint and propose remedial measures. 2. Inform IEC and ER. 3. Repeat measurement to confirm finding;. 4. Increase monitoring frequency.	1. Check monitoring data submitted by the ET. 2. Check the Contractor's working methods.	1. Notify the Contractor.	1. Rectify any unacceptable practices. 2. Amend working methods agreed with the ER as appropriate.
2. Exceedance for two or more consecutive samples	1. Identify sources. 2. Inform the IEC and ER. 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings. 5. Increase monitoring frequency to daily. 6. Discuss with the IEC, ER and Contractor on remedial action required. 7. If exceedance continues, arrange meeting with the IEC, Contractor and ER. 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by the ET. 2. Check the Contractor's working methods. 3. Discuss with the ET, ER and Contractor on possible remedial measures if required. 4. Advise the ER on the effectiveness of proposed remedial measures if required.	1. Notify the Contractor. 2. Ensure remedial measures properly implemented.	1. Submit proposals for remedial action to the ER within 3 working days of notification. 2. Implement the agreed proposals. 3. Amend proposal as appropriate.

EVENT	ACTION			
	ET[1]	IEC[1]	ER[1]	Contractor
Limit Level				
1. Exceedance for one sample	1. Identify sources, investigate causes of exceedance and proposed remedial measures. 2. Inform the IEC, ER, and Contractor. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 5. Assess effectiveness of the Contractor's remedial action and keep the IEC and ER informed of the results.	1. Check monitoring data submitted by the ET. 2. Check the Contractor's working methods. 3. Discuss with the ET, ER and Contractor on possible remedial measures. 4. Advise the ER and ET on the effectiveness of the proposed remedial measures. 5. Supervise the implementation of remedial measures.	1. Confirm receipt of the notification of exceedance in writing. 2. Notify the Contractor. 3. Ensure remedial measures are properly implemented.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial action to the ER and copy to the ET and IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal as appropriate.

Table 5.3: Event and Action Plan for Construction Noise Monitoring

EVENT	ACTION			
	ET[1]	IEC[1]	ER[1]	Contractor
Action Level	1. Notify the IEC, ER and Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IEC and Contractor. 4. Discuss jointly with the ER and Contractor and formulate remedial measures. 5. Increase the monitoring frequency to check the mitigation effectiveness.	1. Review the monitoring data submitted by the ET. 2. Review the construction methods and proposed redial measures by the Contractor, and advise the ET and ER if the proposed remedial measures would be sufficient.	1. Notify the Contractor. 2. Require the Contractor to propose remedial measures for implementation if required.	1. Submit noise mitigation proposals to the ER and copy to the IEC and ET. 2. Implement noise mitigation proposals.
Limit Level	1. Notify the IEC, ER and Contractor. 2. Identify sources. 3. Repeat measurements to confirm findings. 4. Carry out analysis of the Contractor's working procedures with the ER and Contractor to determine possible mitigations to be implemented. 5. Record the causes and action taken for the exceedances. 6. Increase the monitoring frequency. 7. Assess the effectiveness of the Contractor's remedial action with the ER and keep the IEC informed of the results. 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst the ER, ET and Contractor on the potential remedial action. 2. Review the Contractor's remedial action whenever necessary to assure their effectiveness and advise the ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problems. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what portion of work is responsible and instruct the Contractor to stop that portion of works until the exceedance is abated.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial action to the ER and copy to the ET and IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problems still not under control. 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Note (1): ET – Environmental Team, IEC – Independent Environmental Checker, ER – Engineer's Representative

Table 3.2: Event / Action Plan for Construction/Operational Phase

Action Level	ET	IEC	ER	Contractor
Non-conformity on one occasion	1. Identify Source 2. Inform the IEC and the ER 3. Discuss remedial actions with the IEC, the ER and the Contractor 4. Monitor remedial actions until rectification has been completed	1. Check report 2. Check the Contractor's working method 3. Discuss with the ET and the Contractor on possible remedial measures 4. Advise the ER on effectiveness of proposed remedial measures. 5. Check implementation of remedial measures.	1. Notify Contractor 2. Ensure remedial measures are properly implemented	1. Amend working methods 2. Rectify damage and undertake any necessary replacement
Repeated Non-conformity	1. Identify Source 2. Inform the IEC and the ER 3. Increase monitoring frequency 4. Discuss remedial actions with the IEC, the ER and the Contractor 5. Monitor remedial actions until rectification has been completed 6. If exceedance stops, cease additional monitoring	1. Check monitoring report 2. Check the Contractor's working method 3. Discuss with the ET and the Contractor on possible remedial measures 4. Advise the ER on effectiveness of proposed remedial measures 5. Supervise implementation of remedial measures.	1. Notify the Contractor 2. Ensure remedial measures are properly implemented	1. Amend working methods 2. Rectify damage and undertake any necessary replacement

Note:
ET – Environmental Team
IEC – Independent Environmental Checker
ER – Engineer's Representative

Appendix D

Implementation

Appendix 1.1 Implementation Schedule for Environmental Mitigation Measures

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
Miscellaneous											
3.4.2.1		WSD Fresh Water Service Reservoir Undertake an independent study of the effects of the drill and blast tunnelling on the reservoir to the satisfaction of WSD.	Ensure stability of the reservoir during construction	WSD Fresh Water Service Reservoir	MTR Corporation/ Main Contractor	-		✓		n/a	Implemented
Landscape and Visual											
5.12.1.2		Reuse of Existing Topsoil Existing topsoil shall be re-used for new planting areas within the project. The Contractor's construction plan shall consider using the soil removed for backfilling. Suitable storage ground, gathering ground and mixing ground shall be set up if necessary.	Conservation of valuable natural landscape resources	Gascoigne Road Rest Garden, Hill slopes above Chatham Road North, Roadside planters at Hung Hom Road	MTR Corporation/ Main Contractor	EIA recommendation		✓		MTR Corporation / LandsD, LCSD / HyD	Implemented
5.12.1.2		Tree Transplantation Transplantation is proposed for a number of trees which are generally able to provide high amenity value and are likely to survive the transplantation process.	Conservation of valuable natural landscape resources	Gascoigne Road Rest Garden, HOM Station, Yan Fung Street Rest Garden Slopes surrounding Fat Kwong Street Playground, WHA Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	All transplantation will be carried out in accordance with ETWB TCW No. 3/2006.	✓	✓		MTR Corporation / LandsD / HyD / LCSD / AFCD	Implemented
5.12.1.2		Erection of Decorative Hoardings Temporary decorative screen hoardings shall be designed and erected to be compatible with the existing urban context, either brightly and imaginatively or with visually unobtrusive design and colours where more appropriate. All works sites and works areas shall be surrounded by such hoardings, which shall be removed at project completion.	Visual screening of works site during construction	All works sites and Temporary Works Areas	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓		Contractor	Implemented
5.12.1.2		Control of night-time lighting glare All security floodlights for construction sites and temporary works areas shall be equipped with adjustable shield, frosted diffusers and reflective covers, and be carefully controlled	Restricting light pollution to nearby receivers	All works sites and Temporary Works Areas	Main Contractor	EIA recommendation		✓		Contractor	Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
		to minimize light pollution and night-time glare to nearby receivers.									
5.12.1.2		Re-provision of Public Open Spaces Every effort should be made to minimise use of public open spaces, however if affected by the Project they shall be re-provisioned to an equal or improved standard at completion of the project. Sensitive design and reinstatement of the affected Public Open Spaces (Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Playground) shall be made, incorporating replacement facilities to those currently provided and using materials of quality suitable for long term use and acceptable to the relevant government departments including LCSD and PlanD, who shall be consulted on the design of the reinstated public open spaces at an early stage of the design process.	Replacement of loss of resources	Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Playground,	MTR Corporation / Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	LCSD	Implemented
5.12.1.2		Compensatory Tree Planting Suitable land pockets within the project area will be used for the implementation of compensatory mitigation to offset the net loss of key landscape resources and improve visual amenity. A compensatory tree planting proposal including locations of tree compensation will be submitted separately to seek relevant government department's approval, in accordance with ETWB TCW No. 3/2006.	Replacement of loss of resources and Enhancement of visual amenity	Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Playground, WAB, HOM Station WHA Station	MTR Corporation / Main Contractor/ Detailed Design Consultant	ETWB TCW No. 3/2006. WBTC 7/2002	✓	✓	✓	MTR Corporation / LandsD/ HyD/ LCSD/ AFCD	Implemented / To be implemented
5.12.1.2		Horizontal and Slope Greening Shotcreting of cut rock slopes shall be avoided and greening applications employed throughout the project. At HOM Station the backfill slopes shall be hydroseeded and native seedling trees planted. The station roof shall be temporarily greened should there be no further on-site development within 1 year of completion of	Mitigation of loss of resources and Enhancement of visual amenity	Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Playground, WAB, HOM Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	WBTC 25/93 WBTC 17/2000	✓	✓	✓	MTR Corporation / LandsD	Implemented / To be implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
		KTE, until permanent measures are undertaken under the proposed property development stage. Parapets at WAB and HOM Station shall be provided with internal permanent planter boxes. The roof at WAB shall be greened to improve visual amelioration from surrounding high level viewers Station entrances at HOM and WHA shall utilise shrub planting areas to provide localised greening		WHA Station							
5.12.1.2		<u>Planting</u> Vertical greening / climbers shall be applied to all above ground structures against exposed walls where appropriate. Further such localised planting systems shall be instigated subject to technical operational and maintenance constraints.	Mitigation of loss of resources and Enhancement of visual amenity	WAB, HOM Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	MTR Corporation	Implemented / To be implemented
5.12.1.2		<u>Architectural Design Aesthetics for the WAB at Club de Recreio</u> The emergency access and ventilation building shall be designed in a way so as to ensure the form, material and surface detailing of this structure can fit sympathetically into the local context. The form shall consider the Cultural Heritage of the Club de Recreio site as well as other proximate buildings. The structure shall incorporate vertical greening / climbers.	Enhancement of visual amenity	WAB	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	MTR Corporation	Implemented
5.12.1.2		<u>Architectural Design Aesthetics for Above-Ground Structures at HOM Station</u> All station entrances, vent shafts, chillers and other above-ground structures shall be designed in accordance with the standardised MTR Corporation architectural theme for the KTE and other current rail projects. However specific attention shall be undertaken to ensure the form, material and surface detailing of these structures is considered to	Enhancement of visual amenity	HOM Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	MTR Corporation	Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
		fit into the local context in terms of the architectural character of the site.									
5.12.1.2		Architectural Design Aesthetics for Above-Ground Structures at WHA Station These shall be designed in accordance with the standardised MTR Corporation architectural theme for the KTE and other current rail projects. However specific attention shall be undertaken to ensure the form, material and surface detailing of these structures is considered to fit into the local context in terms of the architectural character of the site.	Enhancement of visual amenity	WHA Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	MTR Corporation	Implemented
Air Quality											
S.6.7.1.7 & S.6.9.2.3		Cut-and-Cover areas in the vicinity of adits and shafts (if applicable):- ▪ Heavy construction activities and wind erosion at the cut-and-cover areas, active areas for heavy construction activities: - Watering every hour at exposed soil. ▪ Trucks for transportation of materials: - Wheel washing facilities should be provided at all site exits. Vehicles should be washed before leaving works sites. Spoil on trucks should be well covered before leaving works sites to minimise the generation of dusty materials. - Haul roads within works sites should be paved and water spraying would be provided to keep the wet condition.	To minimise dust impacts	All relevant works sites	MTR Corporation/ Main Contractor/ Detailed Design Consultant	Air Pollution Control Ordinance	✓	✓			Implemented
S.6.7.1.7 & S.6.9.2.3		Barging point at Hung Hom Finger Pier: ▪ For haul roads within the area of barging point for transportation of spoil, all road surfaces should be paved and hourly water spraying should be provided to keep the wet condition as far as practical. ▪ The spoil unloading process should be	To minimise dust impacts	Barging Point at Hung Hom Finger Pier	MTR Corporation/ Main Contractor/Detailed Design Consultant	Air Pollution Control Ordinance	✓	✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
		undertaken within an enclosed tipping hall. Water spraying and 3-sided screen with top should be provided at the discharge point for dust suppression. ▪ Vehicle wheel washing facilities should be provided at the exits of the barging point.									
S.6.7.1.5 & S. 6.7.1.8		Rock crushing equipment at HOM Station and barging point at Hung Hom Finger Pier if operated during construction: ▪ A dust enclosure with fabric baghouse/cartridge filter type dust extraction and collection system or equivalent system with 99% or more dust removal efficiency for the rock crushing equipment, haul road and unloading location; and ▪ Watering of paved roads within the area of the rock crushing facility as good site practice.	To minimise dust impacts	Rock crushing equipment at HOM Station and Barging Point at Hung Hom Finger Pier	MTR Corporation/ Main Contractor/Detailed Design Consultant	Air Pollution Control Ordinance	✓	✓			Implemented
S.6.7.1.5 & S.6.9.2.2		Tarpaulin covers would be provided on wire mesh covered steel cages to prevent dust emission during open blasting at HOM Station;	To minimise dust impacts	Open blasting area at HOM Station	MTR Corporation/ Main Contractor/Detailed Design Consultant	EIA recommendation	✓	✓			Implemented
S.6.9.2.4		Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices: ▪ Use of regular watering, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather. ▪ Use of frequent watering for particularly dusty construction areas and areas close to ASRs. ▪ Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not	To minimise dust impacts	All works sites	MTR Corporation/Main Contractor /Detailed Design Consultant	Air Pollution Control Ordinance	✓	✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
		practicable owing to frequent usage, watering should be applied to aggregate fines. ▪ Open temporary stockpiles should be avoided or covered. Prevent placing dusty material storage piles near ASRs. ▪ Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations. ▪ Establishment and use of vehicle wheel and body washing facilities at the exit points of the site. ▪ Imposition of speed controls for vehicles on unpaved site roads. 8km per hour is the recommended limit. ▪ Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs. ▪ Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides. ▪ Loading, unloading, transfer, handling or storage of large amount of cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system. ▪ Covering or enclosing any conveyor belt systems will generally be fully enclosed, depending on the design, materials chosen, and dimension of the conveyor system.									
Air-borne Noise											
S.7.9.2.6		The following good site practices should be implemented: ▪ Only well-maintained plant should be operated on-site and plants should be serviced regularly during the construction period; ▪ Mobile plant, if any, should be sited as	To minimise air-borne noise impacts	All works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
		far from NSRs as possible; ▪ Plant known to emit noise strongly in one direction should, wherever possible, be properly orientated so that the noise is directed away from the nearby NSRs; ▪ Use of site hoarding as a noise barrier to screen noise at low level NSRs; ▪ Machines and plant that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum; and ▪ Any material stockpiles and other structures should be effectively utilised, wherever practicable, to screen the noise from on-site construction activities.									
S.7.9.2.1		The following quiet PME should be used: ▪ Air compressor ▪ Asphalt Paver ▪ Breaker ▪ Bulldozer ▪ Concrete lorry mixer ▪ Concrete Pump / Grout Pump ▪ Crane ▪ Cutter, circular, steel (electric) ▪ Dump Truck ▪ Backhoe ▪ Generator ▪ Vibrating Poker, hand-held (electric) ▪ Rock Drill ▪ Roller, vibratory ▪ Scraper ▪ Water pump (electric)	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
S.7.9.2.4		Movable or fixed noise barrier should be used for the following PME where practicable: ▪ Wheeled Excavator/Loader ▪ Crane ▪ Hydraulic Breaker ▪ Scraper ▪ Breaker, hand-held ▪ Compactor, vibratory ▪ Drill, percussive, hand-held (electric) ▪ Concrete pump ▪ Circular Saw, bench mounted ▪ Truck ▪ Bar bender and cutter (electric) ▪ Conveyor belt ▪ Generator, Super Silenced ▪ Grout Pump ▪ Saw, wire ▪ Water Pump, Submersible (Electric) ▪ Hydraulic Jack with Pump	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented
S.7.9.2.4		Acoustic fabric should be used for the following PME where practicable: ▪ Compressor and Pneumatic Drilling Rig ▪ Piling, vibrating hammer ▪ Rock Drill ▪ Silent Piling System	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented
S.7.9.2.4		Noise enclosure/acoustic shed should be used for the following PME where practicable and will generally be fully enclosed depending on the design, materials chosen, and dimension of the PME: ▪ Air Compressor ▪ Rock Crushing Equipment	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented
S.7.9.2.4		Silencer should be used for the ventilation fans.	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented
S.7.9.2.6		Use of temporary hoardings along the works boundary.	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
S.7.9.2.2		Noise enclosures should be installed for the muckout points in WS1 (Gascoigne Road Rest Garden), WS7a1 (WAB at Club de Recreio) and WS26a (Fat Kwong Street Playground)	To comply with the criteria of Noise Control Ordinance.	All muckout points at WS1, WS7a1 and WS26a	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented
S.7.9.2.3		Noise enclosures should be installed for all rock crushing equipment.	To comply with the criteria of Noise Control Ordinance.	All rock crushing equipment	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			No rock crushing equipment
S.7.10.1.2		The maximum permissible sound power levels (max SWLs) for the fixed plant should be complied with during the selection of equipment and mitigation measures.	To comply with the criteria of Noise Control Ordinance.	All relevant location of fixed plant	MTR Corporation/ Detailed Design Consultant	Noise Control Ordinance	✓		✓		Implemented
S.7.10.2.1		The detailed design for all fixed plant should incorporate the following good practice where practicable: ▪ Louvers should be orientated away from adjacent NSRs whenever practicable; ▪ Adequate direct noise mitigation measures including silencers, acoustic louvers or acoustic enclosures should be adopted where necessary; and ▪ Quieter plant should be chosen as far as practical.	To comply with the criteria of Noise Control Ordinance.	At outlets of fixed plant including ventilation building, ventilation shafts, plant room for chiller plant and cooling towers, etc	MTR Corporation/ Detailed Design Consultant	Noise Control Ordinance	✓		✓		Implemented
Ground-borne Noise											
S.8.7.1.2		MTR will further review the proposed mitigation measures for operational ground-borne noise during the construction stage after the tunnel boring.	To comply with the criteria of Noise Control Ordinance.	At suitable location	MTR Corporation/ Main Contractor	-	✓				Implemented
S.8.7.1.3		Commissioning test is recommended to ensure compliance of the operational ground-borne noise levels	To comply with the criteria of Noise Control Ordinance.	Designated locations	MTR Corporation/ Main Contractor	Noise Control Ordinance	✓	✓	✓		Implemented
Water Quality											
S.9.7.6		Construction site run-off and general construction activities: ▪ The mitigation measures as outlined in the ProPECC PN 1/94 Construction Site Drainage should be adopted where applicable.	To control water quality impact from construction site runoff and general construction activities	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance, TM-DSS		✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
S.9.7.6		In case seepage of uncontaminated groundwater occurs, groundwater should be pumped out from the works areas and discharged into the storm system via silt removal facilities. Uncontaminated groundwater from dewatering process should also be discharged into the storm system via silt traps.	To control water quality impact from groundwater	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance		✓			Implemented
S.9.7.6		At the barging point, mitigation measures for control of water quality impact from surface run-off should be applied and the following good site practices should also be adopted: ▪ All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash. ▪ All hopper barges should be fitted with tight fitting seals to their bottom openings to prevent leakage of material. ▪ Construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site. ▪ Loading of barges and hoppers should be controlled to prevent splashing of material into the surrounding water. Barges or hoppers should not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation.	To control water quality impact from barging point	Barging point	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance		✓			Implemented
S.9.7.6		For effluent discharge, there is a need to apply to EPD for a discharge licence for discharge of effluent from the construction site under the WPCO. The discharge quality should meet the requirements specified in the discharge licence. Minimum distances of 100m should be maintained between the discharge points of construction site effluent and the existing seawater intakes. If monitoring of the treated effluent quality	To control water quality impact from effluent discharge from construction site	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance		✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the WPCO license which is under the ambit of Regional Office of the EPD.									
S.9.7.6		To prevent the accidental spillage of chemicals, the Contractor should register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.	To control water quality impact from accidental chemical spillage	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance, Waste Disposal Ordinance		✓			Implemented
S.9.7.6		Any service shop and maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges.	To control water quality impact from accidental chemical spillage	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance, Waste Disposal Ordinance		✓			Implemented
S.9.7.6		Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows: ▪ Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. ▪ Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents. ▪ Storage area should be selected at a safe location on site and adequate space	To control water quality impact from accidental chemical spillage	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance, Waste Disposal Ordinance		✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		should be allocated to the storage area.									
S.9.7.6		Regarding the hydrogeological impacts in the construction of cut-and-cover tunnels and associated excavations for the WAB / ventilation building, the following measures should be in place in order to mitigate any drawdown effects to the groundwater table during the operation of the temporary dewatering works: ▪ Toe grouting should be applied beneath the toe level of the temporary/permanent cofferdam walls as necessary to lengthen the effective flow path of groundwater from outside and thus control the amount of water inflow to the excavation. ▪ Recharge wells should be installed as necessary outside the excavation areas. Water pumped from the excavation areas should be recharged back into the ground.	To control groundwater hydrogeological impact and groundwater drawdown	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance		✓			Implemented
S.9.8.6		Measures for the tunnel run-off and drainage include: ▪ Track drainage channels discharge should pass through oil/grit interceptors/chambers to remove oil, grease and sediment before being pumped to the foul sewer/holding tank for further disposal. ▪ The silt traps and oil interceptors should be cleaned and maintained regularly. ▪ Oily contents of the oil interceptors should be transferred to an appropriate disposal facility, or to be collected for reuse, if possible.	To control runoff from rail track	Tunnels and rail tracks	MTR Corporation/ Detailed Design Consultant	Water Pollution Control Ordinance	✓		✓		Implemented
S.9.8.6		Measures for the control of sewage effluents include: ▪ Connection of domestic sewage generated from the KTE project should be diverted to the foul sewer wherever possible. If public sewer system is not available, sewage tankering away	To control water quality impact from sewage effluent discharge from the ventilation building and Stations	Ventilation building and Stations	MTR Corporation/ Detailed Design Consultant	EIAO-TM, Water Pollution Control Ordinance, TM-DSS, ProPECC PN 5/93	✓		✓		Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		services or on-site sewage treatment facilities should be provided to prevent direct discharge of sewage to the nearby storm system and all the discharge should comply with the requirements stipulated in the TM-DSS. ▪ For handling, treatment and disposal of other operation stage effluent, the practices outlined in ProPECC PN 5/93 should be adopted where applicable.									
Waste Management Implications											
S.10.5.6.1		Recommendations for good site practices: ▪ Prepare a Waste Management Plan approved by the Engineer/Supervising Officer of the Project based on current practices on construction sites. ▪ Training of site personnel in, site cleanliness, proper waste management and chemical handling procedures. ▪ Provision of sufficient waste disposal points and regular collection of waste. ▪ Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers. ▪ Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors. ▪ Separation of chemical wastes for special handling and appropriate treatment.	To implement good site practice for handling, sorting reuse and recycling of C&D materials	All works sites	Main Contractor	Waste Disposal Ordinance, Land (Miscellaneous Provisions) Ordinance, ETWB TC(W) No 31/2004		✓			Implemented
S.10.5.6.1		Recommendations for waste reduction measures: ▪ Sorting of demolition debris and excavated materials from demolition works to recover reusable/ recyclable portions (i.e. soil, broken concrete, metal etc.). ▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper	To implement on-site sorting facilitating reuse and recycling of materials as well as proper disposal of waste	All works sites	Main Contractor	Waste Disposal Ordinance, Land (Miscellaneous Provisions) Ordinance		✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		disposal. ▪ Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the workforce. ▪ Proper storage and site practices to minimize the potential for damage or contamination of construction materials. ▪ Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste. ▪ Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycle.									
S.10.5.6.1		The Contractor should prepare and implement a Waste Management Plan as a part of the Environmental Management Plan in accordance with ETWB TCW No 19/2005 which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the construction activities.	To keep trace of the generation, minimization, reuse and disposal of C&D materials in the Project	All works sites	Main Contractor	ETWB TCW No 19/2005		✓			Implemented
S.10.5.6.1		Storage of materials on-site may induce adverse environmental impacts if not properly managed, recommendations to minimise the impacts include: ▪ Waste, such as soil, should be handled and stored well to ensure secure containment, thus minimising the potential of pollution. ▪ Maintain and clean storage areas routinely. ▪ Stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away. ▪ Different locations should be designated to stockpile each material to enhance	To minimise potential impacts of waste storage and enhance reusable volume	All works sites	Main Contractor	-		✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		reuse.									
S.10.5.6.1		Waste hauliers must hold a valid permit for the collection of waste as stipulated in their permits. Removal of waste should be done in a timely manner.	To collect and remove waste generated	All works sites	Main Contractor	-		✓			Implemented
S.10.5.6.1		Implementation of trip-ticket system to monitor waste disposal and control fly-tipping. ▪ Set up warning signs at vehicular access points reminding drivers of designated disposal sites and penalties of an offence. ▪ Installation of close-circuited television at access points of vehicles to monitor and prevent illegal dumping.	To monitor disposal of waste and control fly-tipping	All works sites	Main Contractor	ETWB TC(W) No 31/2004		✓			Implemented
S.10.5.6.1		Wheel washing facilities should be provided before the trucks leave the works area.	To minimise dust impact	All works sites	Main Contractor	-		✓			Implemented
S.10.5.6.1		The Contractor should ensure the on-site separation from inert portion. The waste delivered to landfill should not contain any free water or have water content more than 70% by weight. The haulier must ensure suitable amount of waste would be loaded on different types of trucks used. A one-week notice should be given to EPD with information on Contractor's name and respective contact details.	To meet the requirement for disposal at landfill	All works sites	Main Contractor	-		✓			Implemented
S.10.5.6.1		If chemical wastes are produced at the construction site, the Contractor would be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Containers used for storage of chemical waste should : ▪ Be compatible with the chemical wastes being stored, maintained in good condition and securely sealed. ▪ Have a capacity of less than 450 litres unless the specifications have been approved by EPD; and ▪ Display a label in English and Chinese	To properly store the chemical waste within works sites and works areas	All works sites	Main Contractor	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes		✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		in accordance with instructions prescribed in Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation.									
S.10.5.6.1		The chemical storage areas should: ▪ Be clearly labelled to indicate corresponding chemical characteristics of the chemical waste and used for storage of chemical waste only. ▪ Be enclosed on at least 3 sides. ▪ Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest. ▪ Have adequate ventilation. ▪ Be covered to prevent rainfall from entering. ▪ Be properly arranged so that incompatible materials are adequately separated.	To prepare appropriate storage areas for chemical waste at works areas	All works sites	Main Contractor	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes		✓			Implemented
S.10.5.6.1		Lubricants, waste oils and other chemical wastes would be generated during the maintenance of vehicles and mechanical equipments. Used lubricants should be collected and stored in individual containers which are fully labelled in English and Chinese and stored in a designated secure place.	To clearly label the chemical waste at works areas	All works sites	Main Contractor	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes		✓			Implemented
S.10.5.6.1		A trip-ticket system should be operated in accordance with the Waste Disposal (Chemical Waste) (General) Regulation to monitor all movements of chemical waste. The Contractor should employ a licensed collector to transport and dispose of the chemical wastes, to either the approved CWTC at Tsing Yi, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	To monitor the generation, reuse and disposal of chemical waste	All works sites	Main Contractor	Waste Disposal (Chemical Waste) (General) Regulation		✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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S.10.5.6.1		General refuse should be stored in enclosed bins or compaction units separate from C&D materials and chemical waste. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D materials and chemical wastes.	To properly store and separate from other C&D materials for subsequent collection and disposal	All works sites	Main Contractor	-		✓			Implemented
S.10.5.6.1		The recyclable component of general refuse, such as aluminium cans, paper and cleansed plastic containers should be separated from other waste. Provision and collection of recycling bins for different types of recyclable waste should be set up by the Contractor. The Contractor should also be responsible for arranging recycling companies to collect these materials.	To facilitate recycling of recyclable portions of refuse	All works sites	Main Contractor	-		✓			Implemented
S.10.5.6.1		The Contractor should carry out a training programme for workers in avoiding, reducing, reusing and recycling of materials generation. Posters and leaflets advising on the use of the bins should also be provided in the sites as reminders.	To raise workers' awareness on recycling issue	All works sites	Main Contractor	-		✓			Implemented
S.10.6.4		Chemical waste during the operation of the KTE project: ▪ The requirements stipulated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes should be followed in handling of chemical waste as in construction phase. ▪ A trip-ticket system should be operated in accordance with the Waste Disposal (Chemical Waste) (General) Regulation to monitor all movements of chemical wastes which would be collected by a licensed collector to a licensed facility for final treatment and disposal. ▪ The recommendations proposed for the mitigation of impacts from chemical waste in construction phase should also be followed.	To avoid environmental impacts in handling, storage and disposal of chemical waste	Ventilation building and Stations	MTR Corporation	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, Waste Disposal (Chemical Waste) (General) Regulation			✓		Implemented
S.10.6.4		General refuse during the operation of the	To separate the general refuse from other waste	Ventilation building and	MTR Corporation	-			✓		Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		KTE project: ▪ Provide recycling bins at designated areas for proper recycling of papers, aluminium cans and plastics bottles. ▪ Separation from other waste types and collected by licensed collectors at daily basis to minimize the potential impacts from odour and vermin.	types and proper disposal of the refuse	Stations							
S.10.6.4		Industrial waste during the operation of the KTE project: ▪ Separation of reusable components like steel before collection by licensed collector	To recycle useful materials from industrial waste and proper disposal	Ventilation building and Stations	MTR Corporation	-			✓		Implemented
Hazard to Life											
S.12.12.1, S 12.12.6	Section 12.10.2.1, Section 12.10.2.4	Improved truck design to reduce the amount of combustibles in, front exhaust spark arrester, 1 x 9 kg water based and 1 x 9 kg dry chemical powder fire extinguishers. This should be combined with monthly vehicle inspection.	To meet the ALARP requirement.	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.1	Section 12.10.2.1	The explosive truck accident frequency should be minimized by implementing a dedicated training programme for both the driver and his attendants, including regular briefing sessions, implementation of a defensive driving attitude. In addition, drivers should be selected based on good safety record, and medical checks.	To meet the ALARP requirement.	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.1	Section 12.10.2.1	The contractor should as far as practicable combine the explosive deliveries for a given work area.	To meet the ALARP requirement.	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.1	Section 12.10.2.1	The explosive truck fire involvement frequency should be minimized by implementing a better emergency response and training to make sure the adequate fire extinguishers are used and attempt is made to evacuate the area of the incident or securing the explosive load if possible. All explosive vehicles should also be equipped with bigger	To meet the ALARP requirement.	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		capacity AFFF-type extinguishers.									
S.12.12.1	Section 12.10.2.1	A minimum headway between two consecutive truck conveys of at least 10 min is recommended	To meet the ALARP requirement.	Along explosives transport routes	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.2	Section 12.10.2.2	Blasting activities including storage and transport of explosives should be supervised and audited by competent site staff to ensure strict compliance with the blasting permit conditions.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Works areas at which explosives would be stored and/or used.	MTR Corporation/ Main Contractor	Dangerous Goods Ordinance		✓		-	Implemented
S.12.12.1 & S.12.12.7.2	Section 12.10.2.1 & Section 12.10.2.5	Only the required quantity of explosives for a particular blast should be transported to avoid the return of unused explosives to the temporary magazine. The number of return trips to the temporary magazine with the full load of explosives or partial load should be minimised by proper co-ordination between blasting and delivery. If disposal is required for small quantities, disposal should be made in a controlled and safe manner by a Registered Shotfirer.	To reduce the risk during explosives transport.	Works areas at which explosives would be stored and/ or used.	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.5	Section 12.10.2.4	Use only experienced driver(s) with good safety record for explosive vehicle(s). Training should be provided to ensure it covers all major safety subjects.	To ensure safe transport of explosives.	At suitable location	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.5	Section 12.10.2.4	Develop procedure to ensure that parking space on the site is available for the explosives truck. Confirmation of parking space should be communicated to truck drivers before delivery.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.3	Section 12.10.2.3	Delivery vehicles shall not be permitted to remain unattended within the temporary magazine site (or appropriately wheel-locked).	To reduce the risk of fire within the magazine	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.3	Section 12.10.2.3	Good house-keeping within and outside of the temporary magazine to ensure that combustible materials (including vegetation)	To reduce the risk of fire within the magazine	Temporary explosives	MTR Corporation/ Main Contractor	-		✓		-	Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		are removed and not allowed to accumulate.		magazine							
S.12.12.5	Section 12.10.2.4	Detonators shall not be transported in the same vehicle with other Class 1 explosives.	To reduce the risk of explosion during the transport of cartridged emulsion	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.2	Section 12.10.2.2	Emergency plan (i.e. temporary magazine operational manual) shall be developed to address uncontrolled fire in temporary magazine area. The case of fire near an explosive carrying truck in jammed traffic should also be covered. Drill of the emergency plan should be carried out at regular intervals.	To reduce the risk of fire.	Temporary explosives magazine and along explosives transport routes	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.2	Section 12.10.2.2	Adverse weather working guideline should be developed to clearly define procedure for transport explosives during thunderstorm.	To ensure safe transport of explosives.	Along explosives transport routes	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.2	Section 12.10.2.2	The magazine storage quantities need to be reported on a monthly basis to ensure that the two day storage capacity is not exceeded.	To reduce the risk within the magazine	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.5	Section 12.10.2.4	During transport of the explosives within the tunnel, hot work should not be permitted in the vicinity of the explosives offloading or charging activities.	To ensure safe transport of explosives.	Along explosives transport routes	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.5	Section 12.10.2.4	Ensure that UN 1.4B packaging of detonators remains intact until handed over at blasting site.	To reduce the risk of explosion during the transport of detonator.	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.6	Section 12.10.2.4	Steel vehicle tray welded to a steel vertical fire screen should be mounted at least 150 mm behind the drivers cab and 100 mm from the steel cargo compartment, the vertical screen shall protrude 150 mm in excess of all three (3) sides of the steel cargo compartment	To reduce the risk during explosives transport.	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.10	Section 12.10.2.5	Ensure cartridged emulsion with high water content should be preferred. Also, the emulsion with perchlorate formulation	To ensure safe explosives to be used.	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		should be avoided.									
S.12.12.3	Section 12.10.2.3	Traffic Management should be implemented within the temporary magazine site, to ensure that no more than 1 vehicle will be loaded at any time, in order to avoid accidents involving multiple vehicles within the site boundary. Based on the construction programme, considering that 6 trucks could be loaded over a peak 2 hour period, this is considered feasible.	To ensure that the risks from the proposed explosives storage and transport would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.3	Section 12.10.2.3	The design of the fill slope close to the temporary magazine site should consider potential washout failures and incorporate engineering measures to prevent a washout causing damage to the temporary magazine stores	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor,/Fill Bank Office	-		✓		-	Implemented
S.12.12.2	Section 12.10.2.2	The security plan should address different alert security level to reduce opportunity for arson / deliberate initiation of explosives. The corresponding security procedure should be implemented with respect to prevailing security alert status announced by the Government.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.3	Section 12.10.2.3	A suitable work control system should be introduced, such as an operational manual including Permit-to-Work system.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.3	Section 12.10.2.3	The magazine building shall be regularly checked for water seepage through the roof, walls or floor.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented

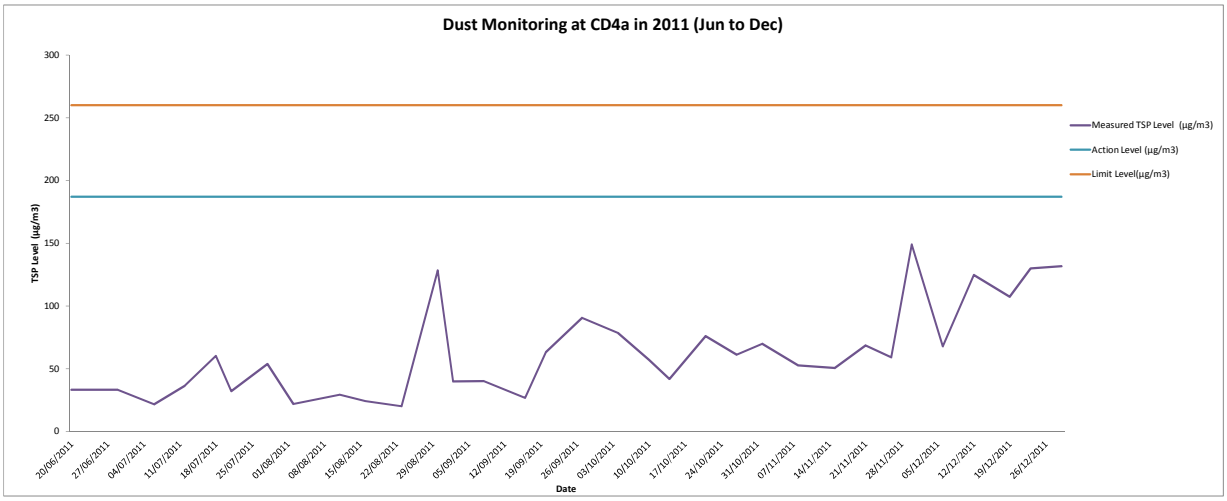
Note: D = Design
C = Construction
O = Operation

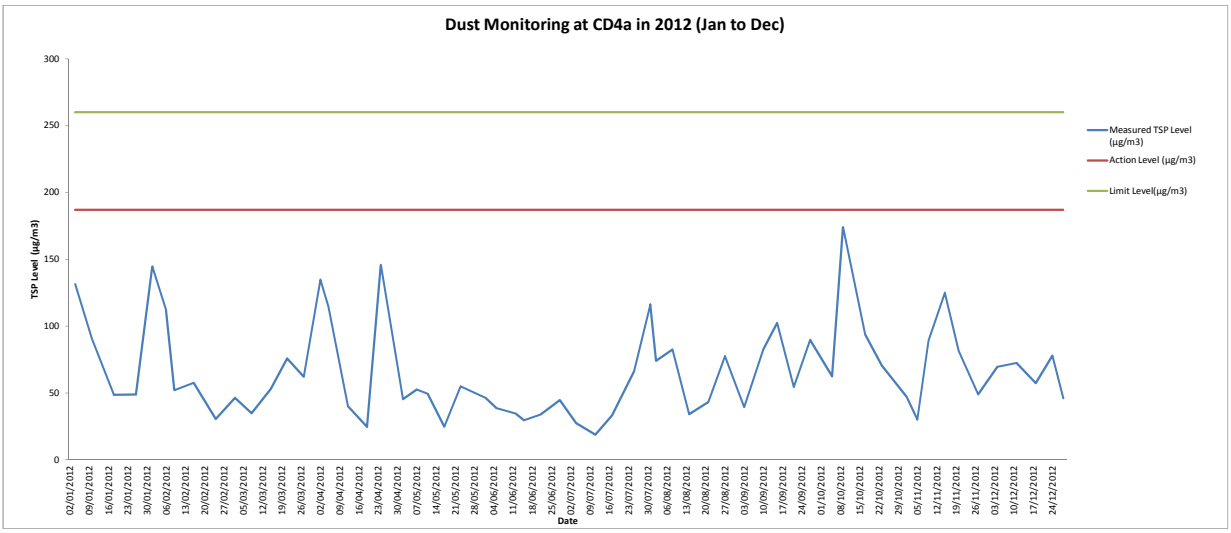
Appendix E

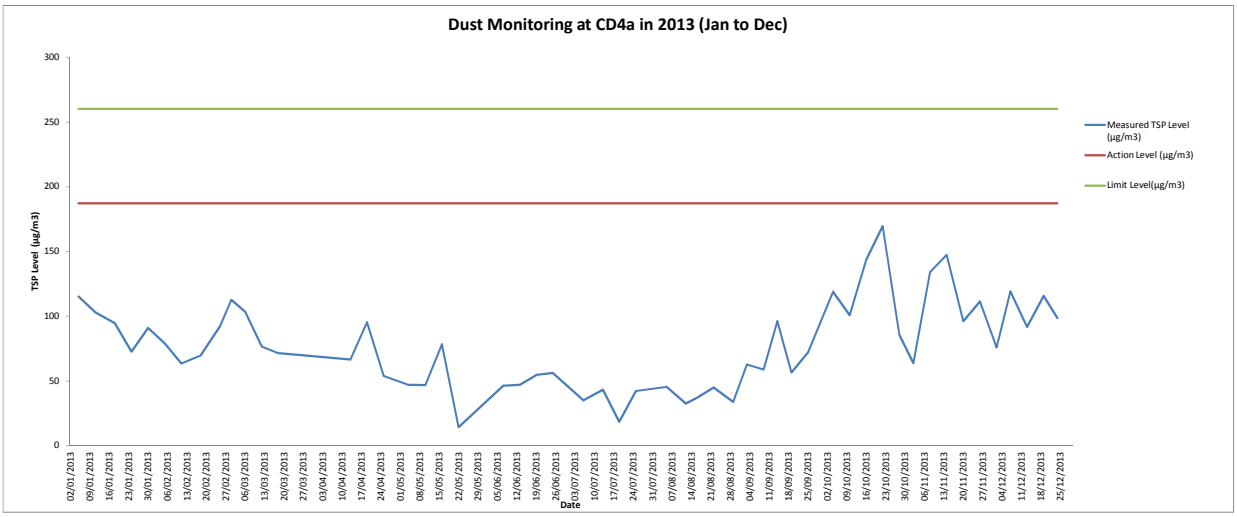
Impact Monitoring Graphical Plots (Air Quality Monitoring Results)

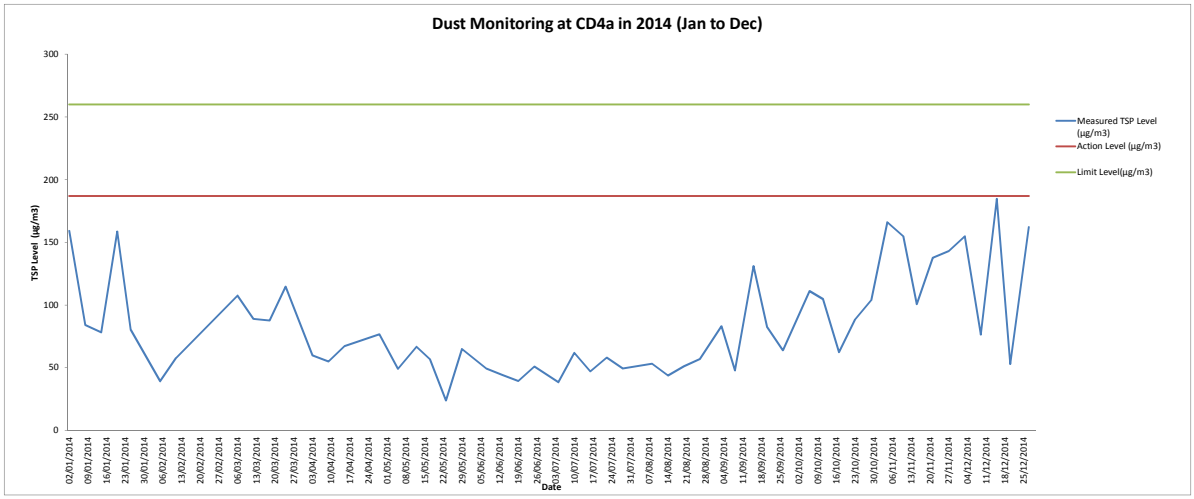
Major activities carried out at respective construction areas:

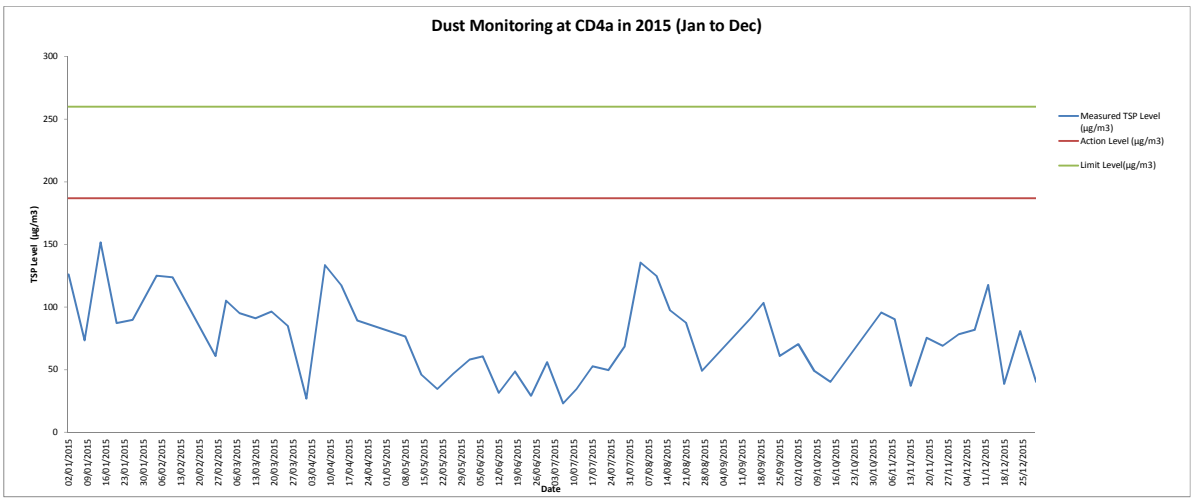
Noise Monitoring Points	**Works Areas**		
CD4a - Ka Fu Building, Whampoa Estate	**West Concourse**	Major Activities:	Period:
		1. Piling and Shoring Works	Q4 2011 – Q4 2014
		2. Excavation and Structure	Q2 2012 – Q2 2015
		3. Finishes / Track Works	Q2 2015 – Q1 2016
		4. Backfill and Road Restatement Works	Q2 2016 to Q3 2017
CD5 - Fung Kei Millennium Primary School	**East Concourse**	Major Activities:	Period:
		1. Piling and Shoring Works	Q4 2011 – Q4 2014
		2. Excavation and Structure	Q2 2012 – Q2 2015
		3. Finishes / Track Works	Q2 2015 – Q1 2016
		4. Backfill and Road Restatement Works	Q2 2016 to Q2 2017
CD5 - Fung Kei Millennium Primary School	**Wan Hoi Street**	Major Activities:	Period:
		1. Shaft Excavation / Structure	Q4 2011 – Q2 2015
		2. Tunnel Excavation and Track Works	Q2 2014 to Q1 2016
		3. Reinstatement of site	Q4 2016 to Q2 2017

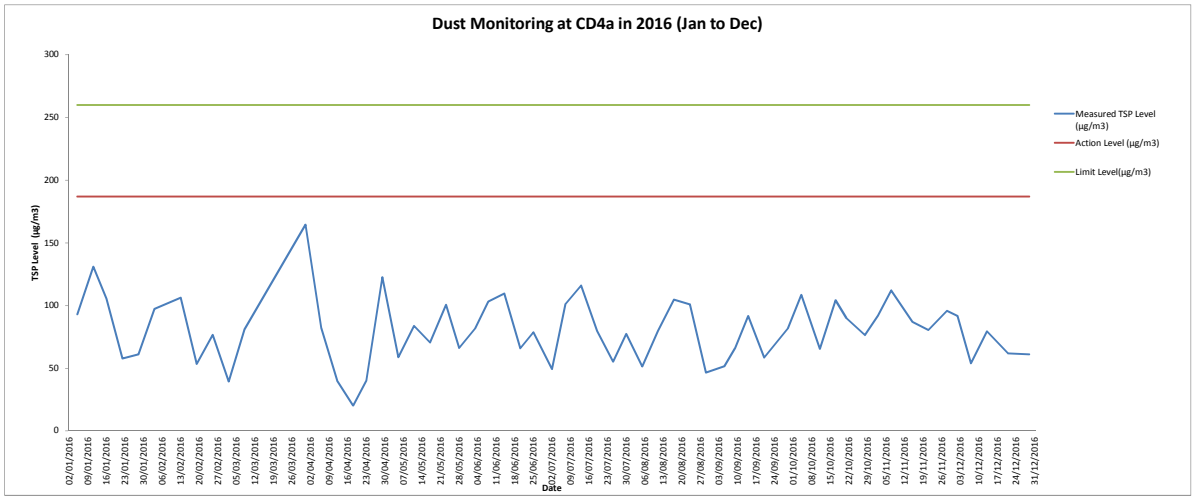

Dust Monitoring at CD4a in 2011 (Jun to Dec)
TSP Level (µg/m3)
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)

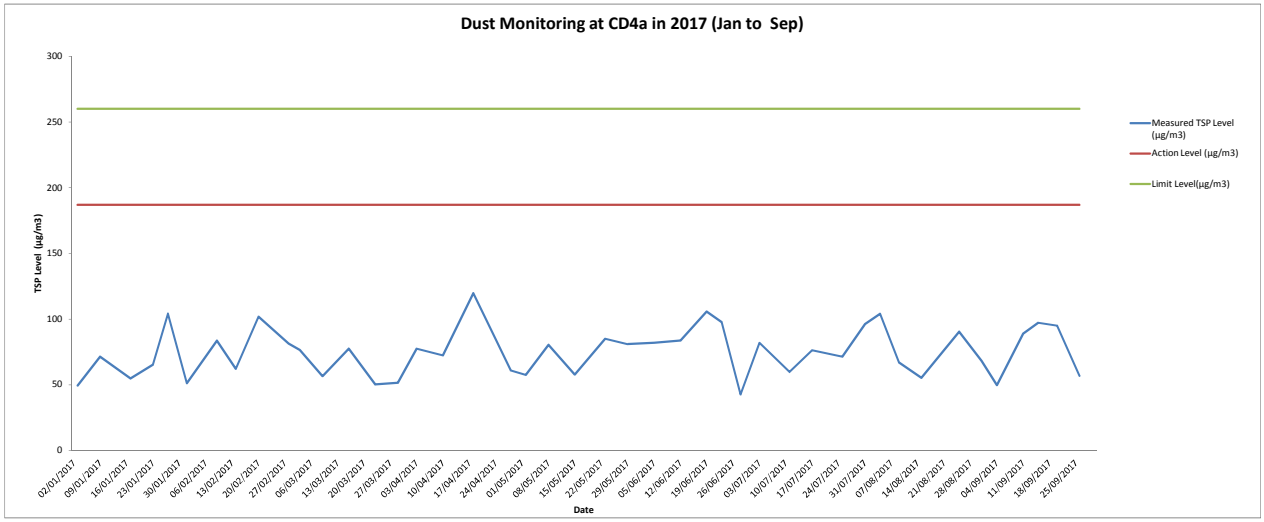

Dust Monitoring at CD4a in 2012 (Jan to Dec)
TSP Level (µg/m3)
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)

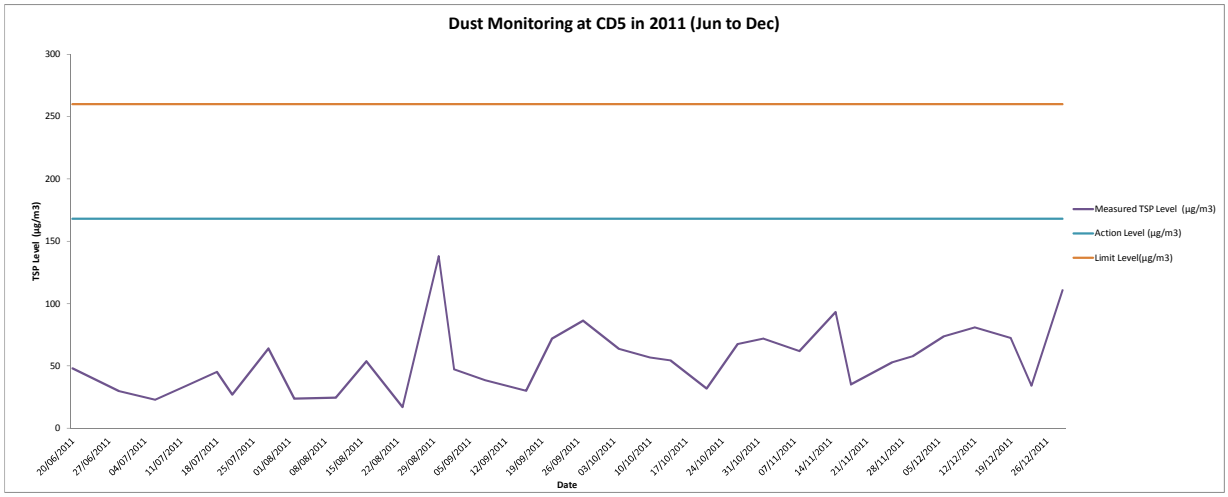

Dust Monitoring at CD4a in 2013 (Jan to Dec)
TSP Level (µg/m3)
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)

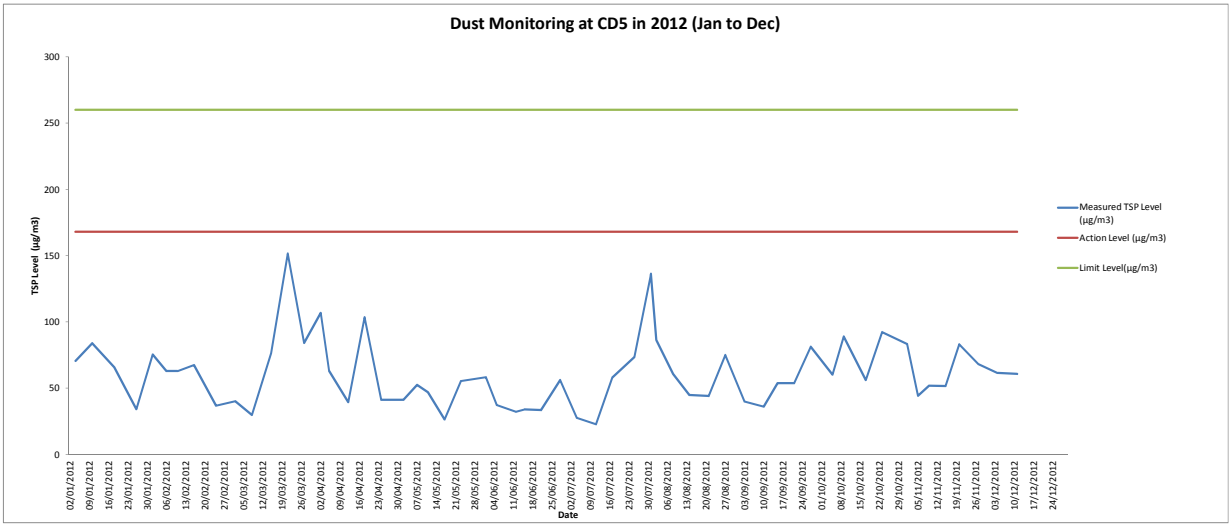

Dust Monitoring at CD4a in 2014 (Jan to Dec)
TSP Level (µg/m3)
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)

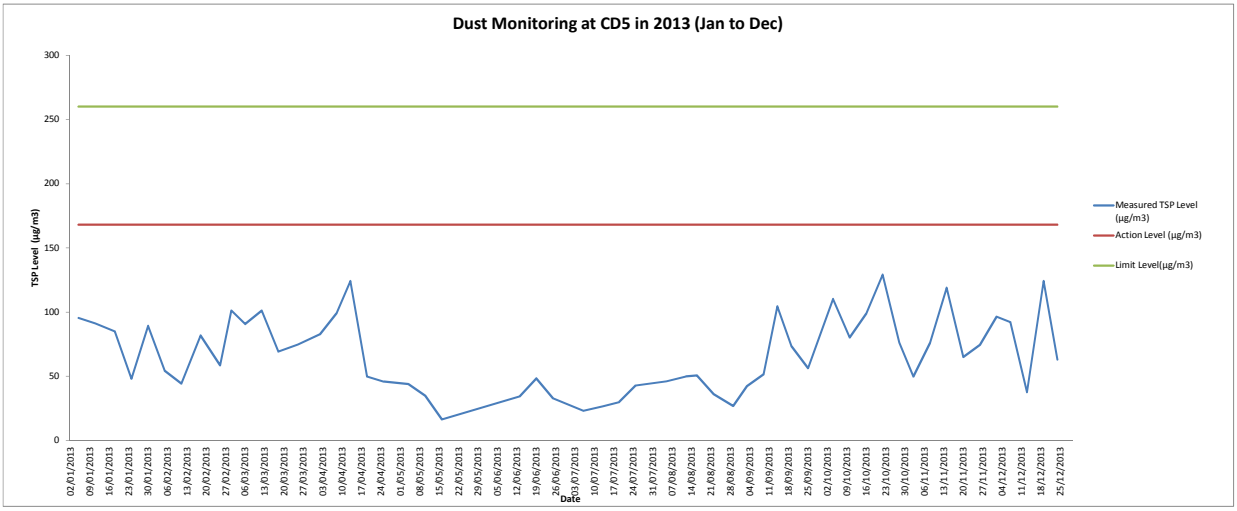

Dust Monitoring at CD4a in 2015 (Jan to Dec)
TSP Level (µg/m3)
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)

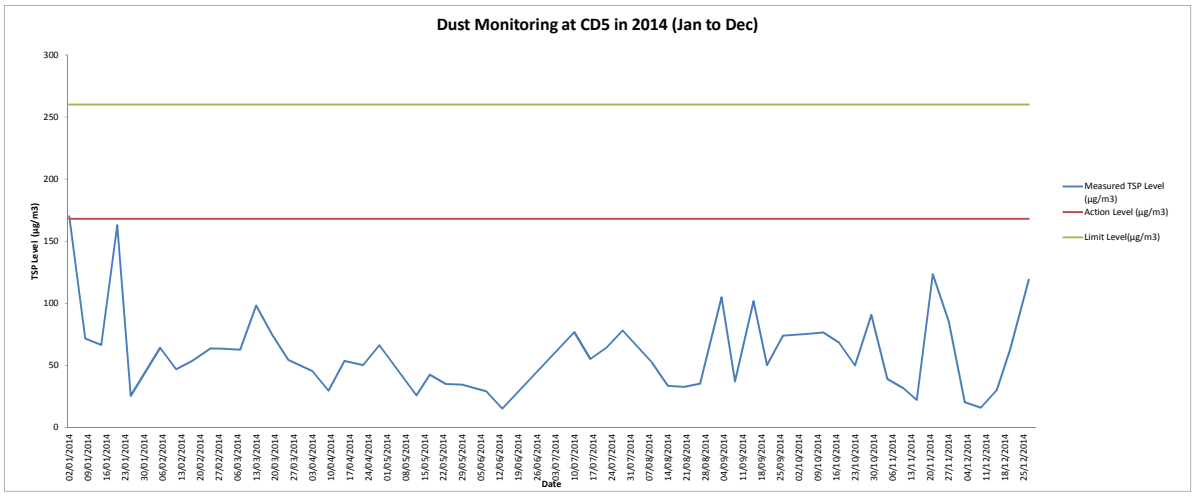

Dust Monitoring at CD4a in 2016 (Jan to Dec)
TSP Level (µg/m3)
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)

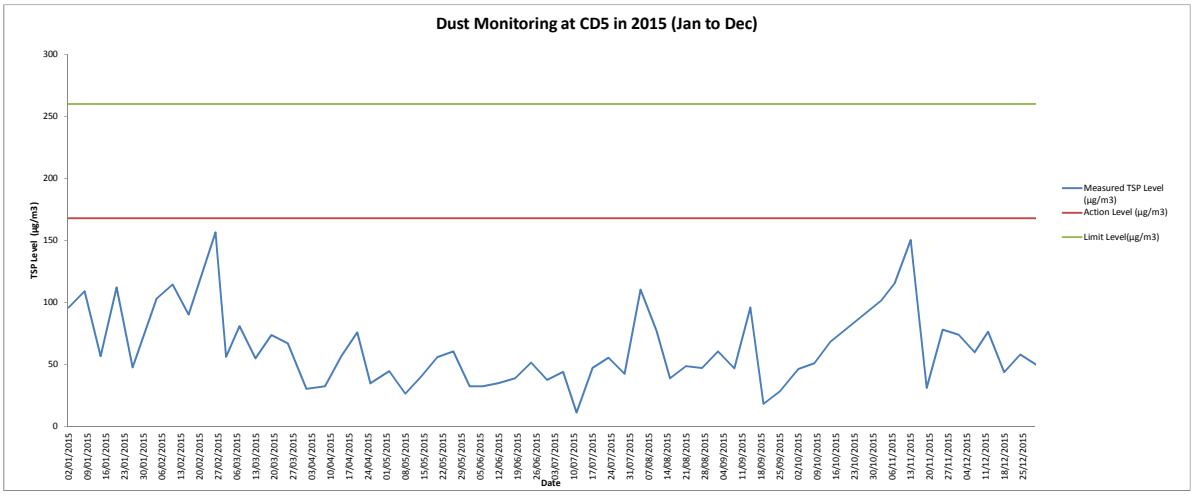

Dust Monitoring at CD4a in 2017 (Jan to Sep)
TSP Level (µg/m3)
300
250
200
150
100
50
0
02/01/2017
09/01/2017
16/01/2017
23/01/2017
30/01/2017
06/02/2017
13/02/2017
20/02/2017
27/02/2017
06/03/2017
13/03/2017
20/03/2017
27/03/2017
03/04/2017
10/04/2017
17/04/2017
24/04/2017
01/05/2017
08/05/2017
15/05/2017
22/05/2017
29/05/2017
05/06/2017
12/06/2017
19/06/2017
26/06/2017
03/07/2017
10/07/2017
17/07/2017
24/07/2017
31/07/2017
07/08/2017
14/08/2017
21/08/2017
28/08/2017
04/09/2017
11/09/2017
18/09/2017
25/09/2017
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)

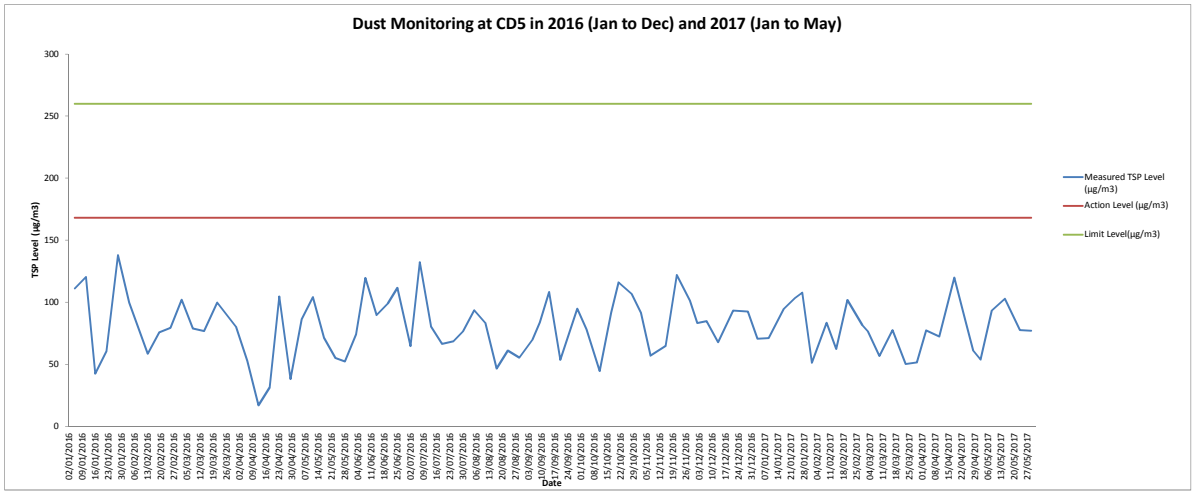

Dust Monitoring at CD5 in 2011 (Jun to Dec)
TSP Level (µg/m3)
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)


Dust Monitoring at CD5 in 2012 (Jan to Dec)
TSP Level (µg/m3)
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)


Dust Monitoring at CD5 in 2013 (Jan to Dec)
TSP Level (µg/m3)
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)


Dust Monitoring at CD5 in 2014 (Jan to Dec)
TSP Level (µg/m3)
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)


Dust Monitoring at CD5 in 2015 (Jan to Dec)
TSP Level (µg/m3)
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)

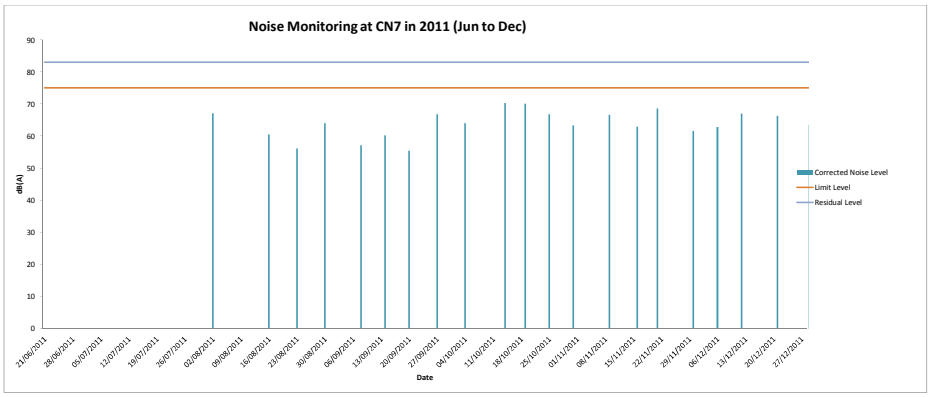

Dust Monitoring at CD5 in 2016 (Jan to Dec) and 2017 (Jan to May)
TSP Level (µg/m3)
Date
Measured TSP Level (µg/m3)
Action Level (µg/m3)
Limit Level(µg/m3)

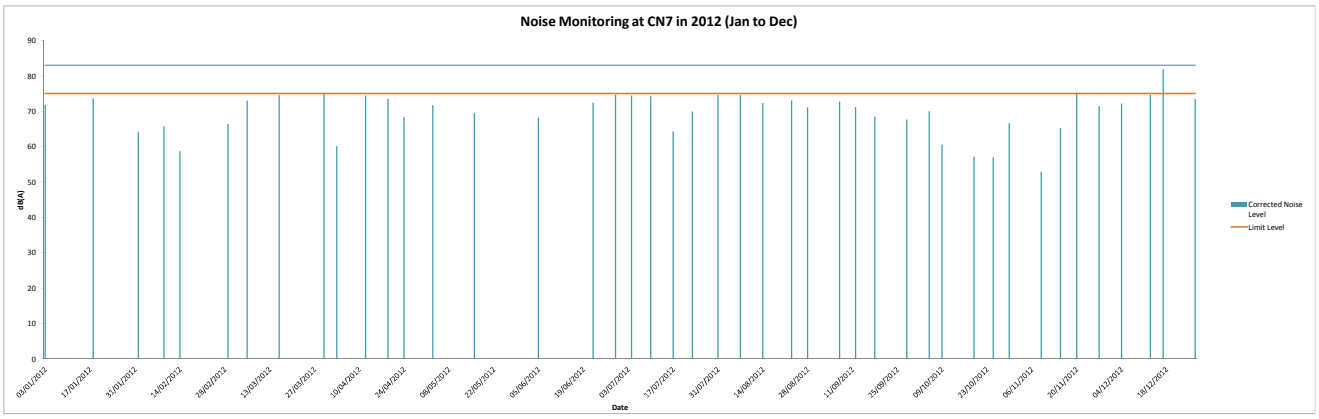
Appendix E

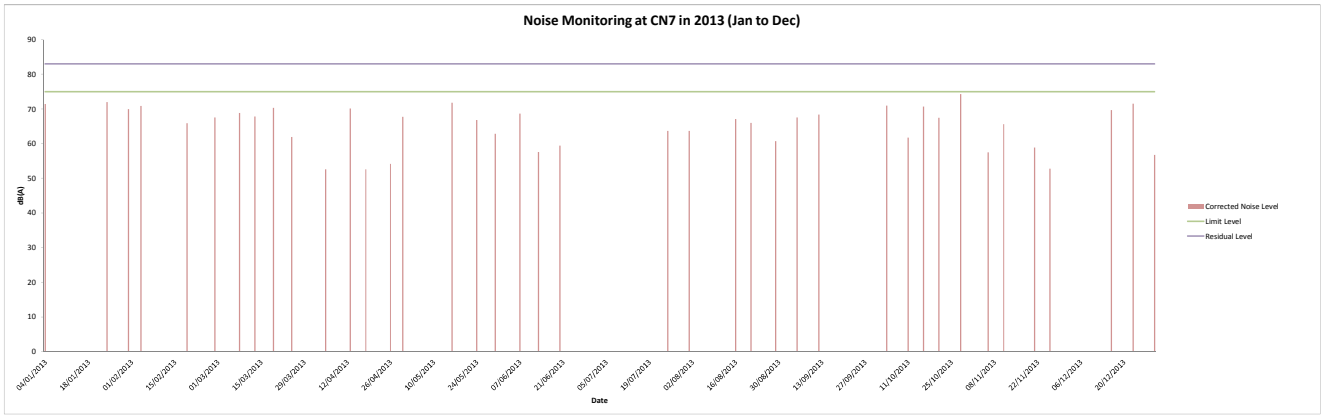
Impact Monitoring Graphical Plots (Impact Noise Monitoring Results)

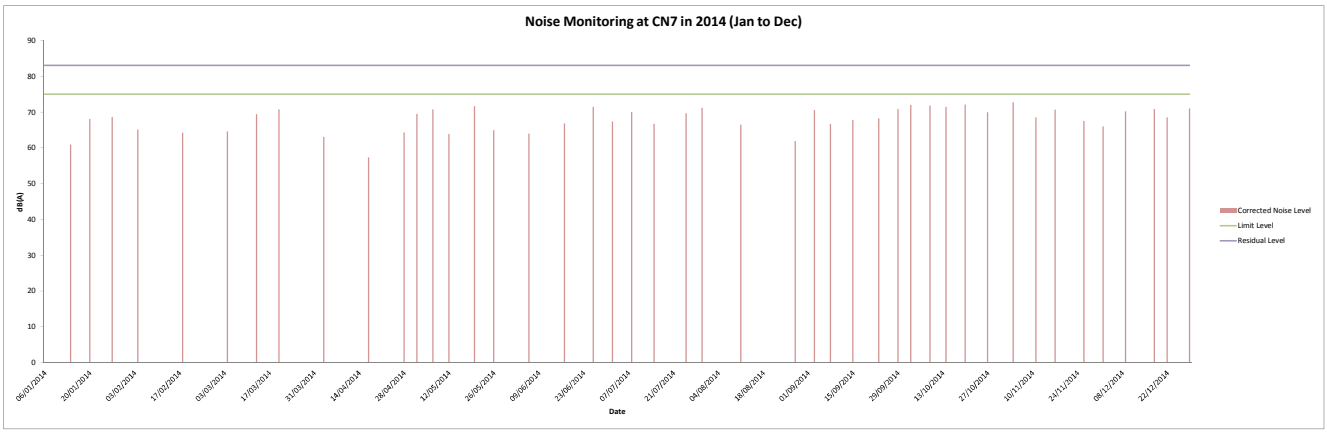
Major activities carried out at respective construction areas:

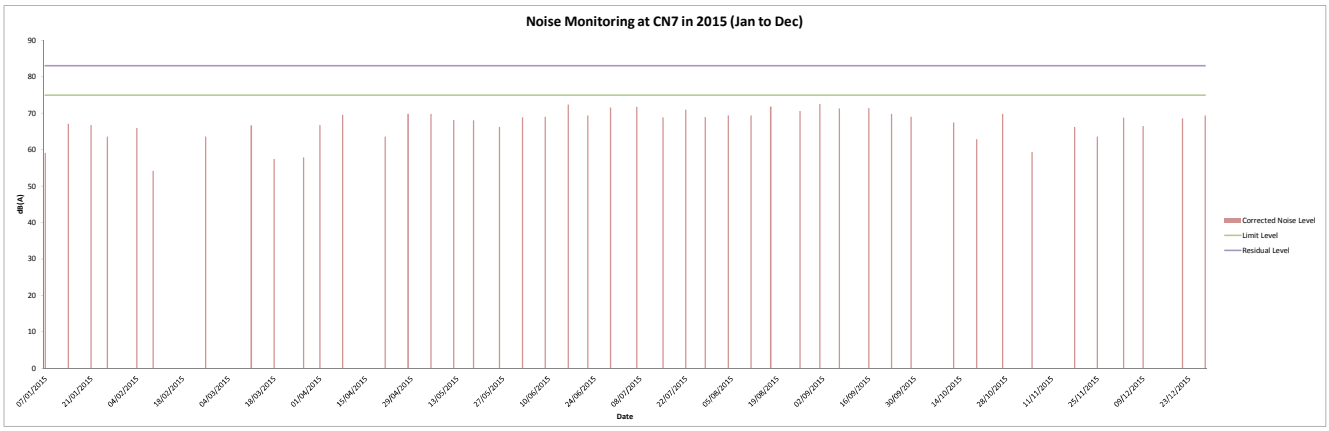
Noise Monitoring Points	**Works Areas**		
CN7 - Block Y, Ki Fu Building, Whampoa Estate CN8 - Block I, Lok Wah Building, Whampoa Estate	**West Concourse**	Major Activities:	Period:
		1. Piling and Shoring Works	Q4 2011 – Q4 2014
		2. Excavation and Structure	Q2 2012 – Q2 2015
		3. Finishes / Track Works	Q2 2015 – Q1 2016
		4. Backfill and Road Restatement Works	Q2 2016 to Q3 2017
CN9 - Block 13, Bauhinia Mansions, Whampoa Garden Site 11 CN10 - Block 1, Oak Mansions, Whampoa Garden Site 5 CN11- Fung Kei Millennium Primary School	**East Concourse**	Major Activities:	Period:
		1. Piling and Shoring Works	Q4 2011 – Q4 2014
		2. Excavation and Structure	Q2 2012 – Q2 2015
		3. Finishes / Track Works	Q2 2015 – Q1 2016
		4. Backfill and Road Restatement Works	Q2 2016 to Q2 2017
CN12 - GCEPSA Whampoa Primary School	**Wan Hoi Street**	Major Activities:	Period:
		1. Shaft Excavation / Structure	Q4 2011 – Q2 2015
		2. Tunnel Excavation and Track Works	Q2 2014 to Q1 2016
		3. Reinstatement of site	Q4 2016 to Q2 2017

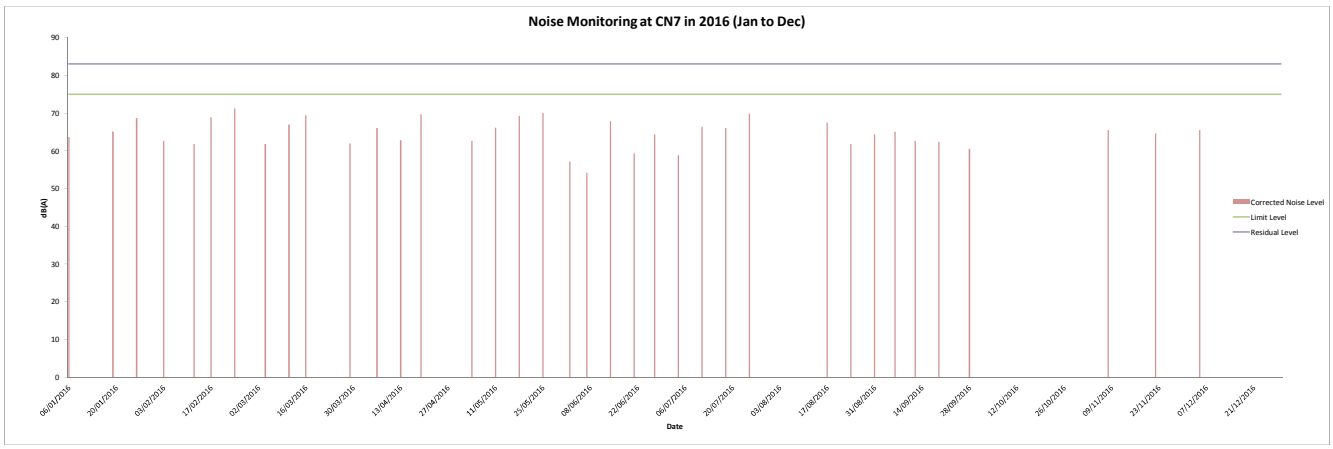

Noise Monitoring at CN7 in 2011 (Jun to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

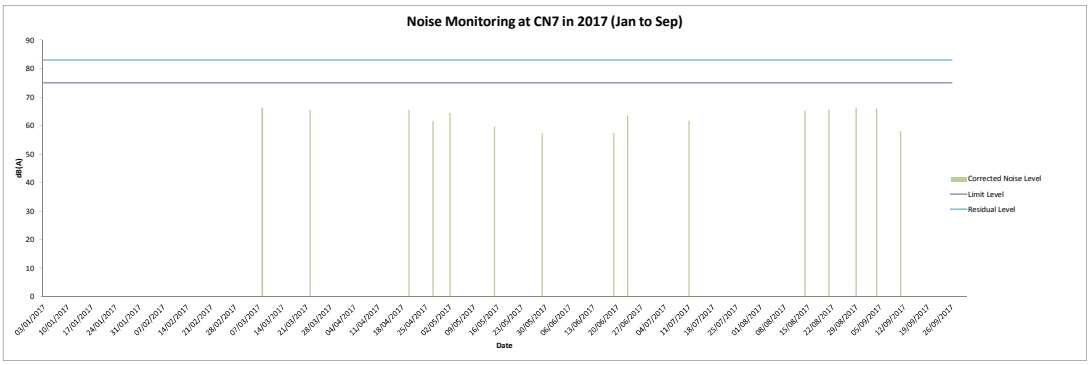

Noise Monitoring at CN7 in 2012 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level

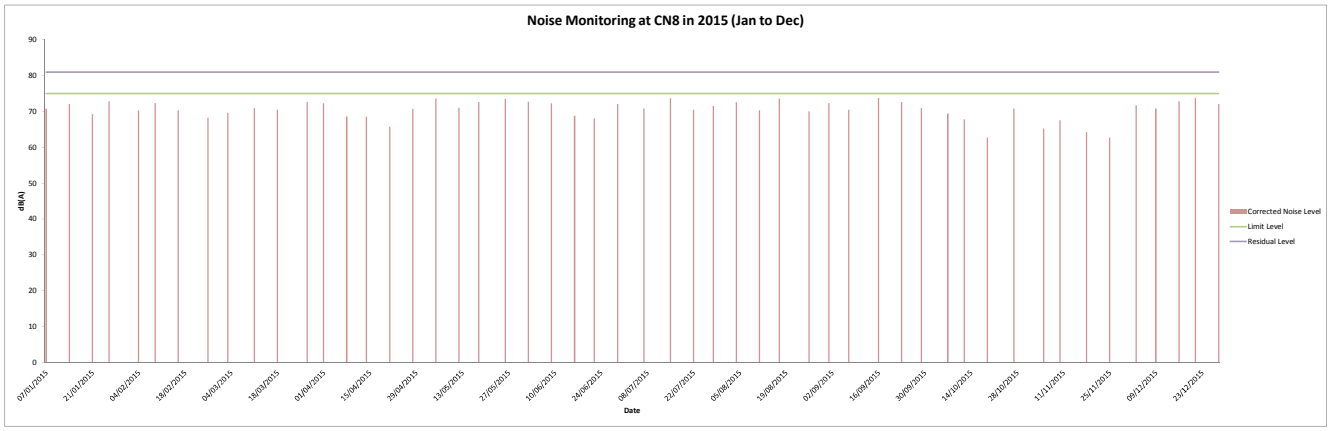

Noise Monitoring at CN7 in 2013 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

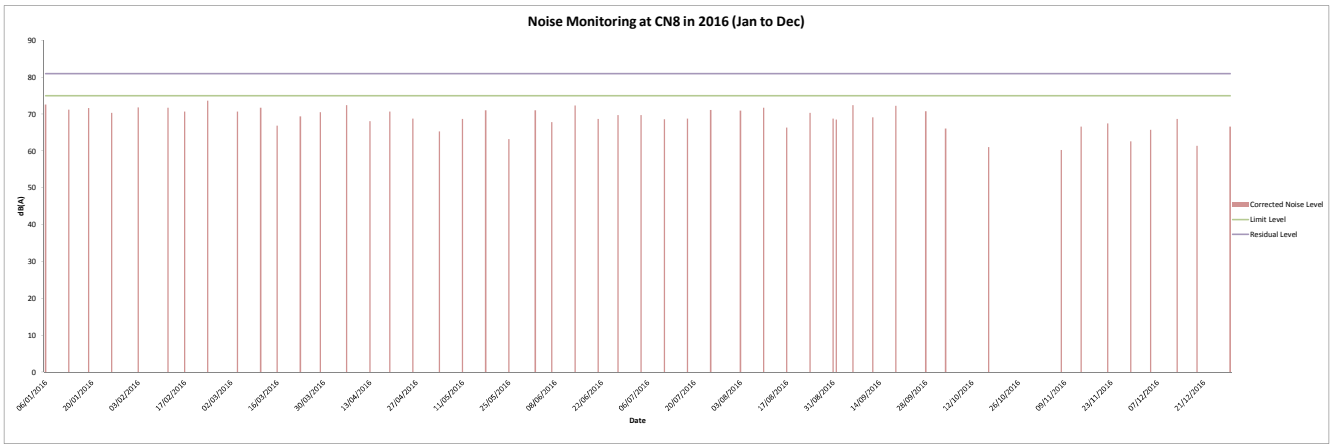

Noise Monitoring at CN7 in 2014 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

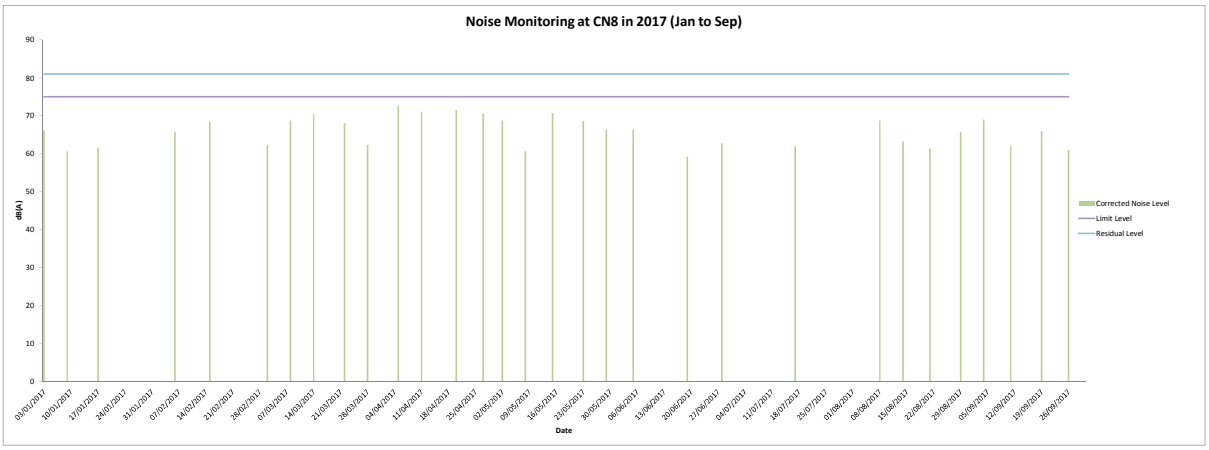

Noise Monitoring at CN7 in 2015 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

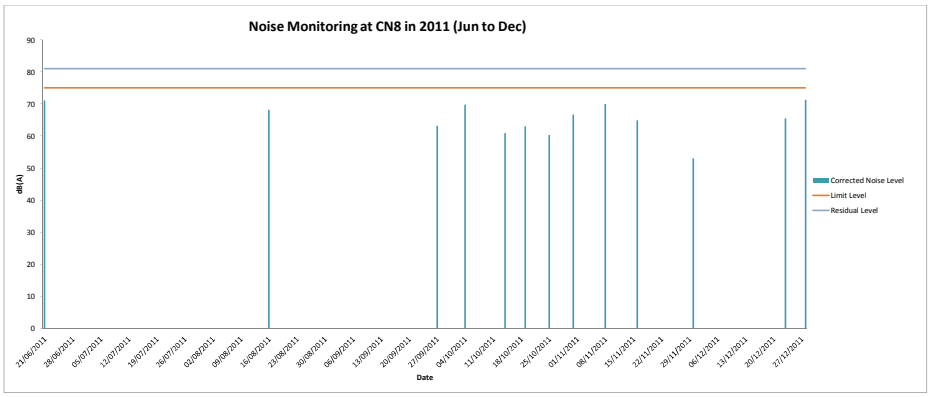

Noise Monitoring at CN7 in 2016 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

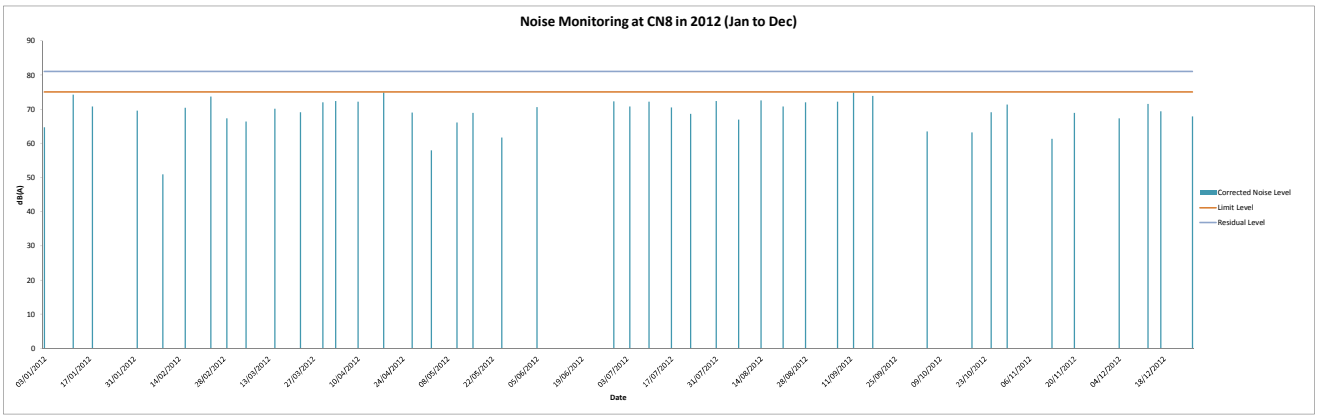

Noise Monitoring at CN7 in 2017 (Jan to Sep)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

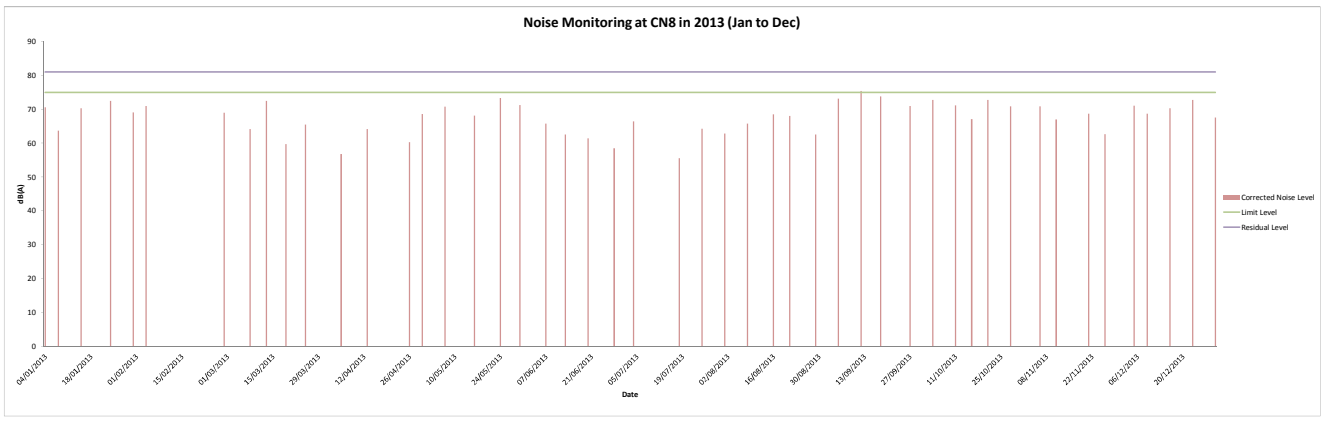

Noise Monitoring at CN8 in 2015 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

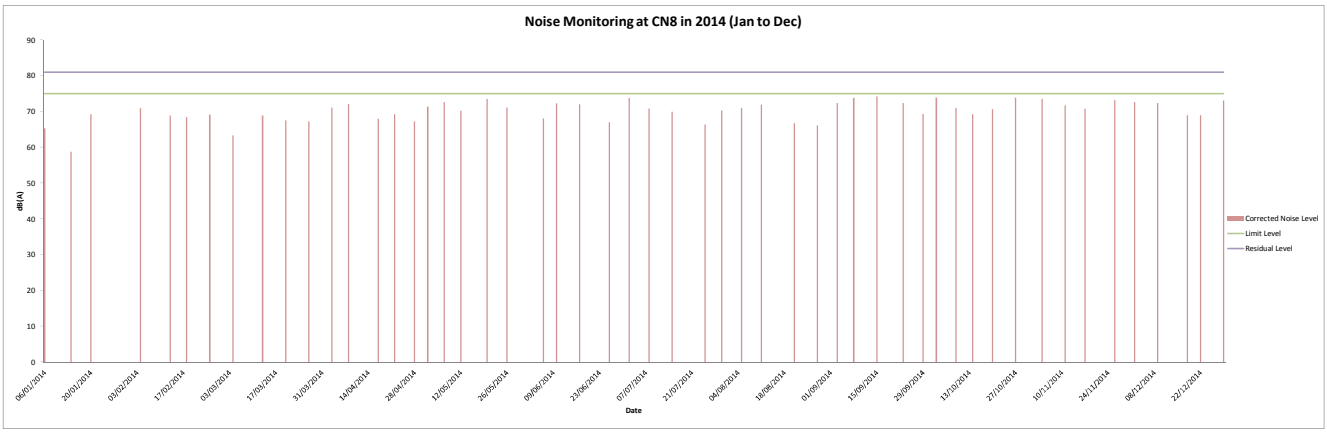

Noise Monitoring at CN8 in 2016 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

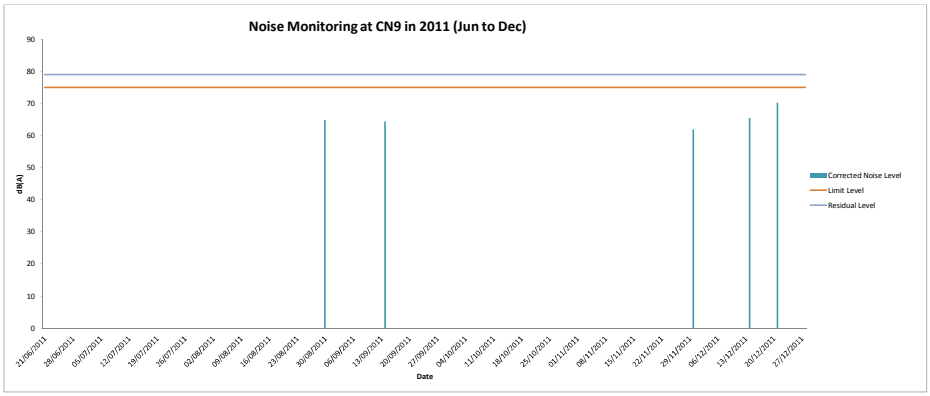

Noise Monitoring at CN8 in 2017 (Jan to Sep)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

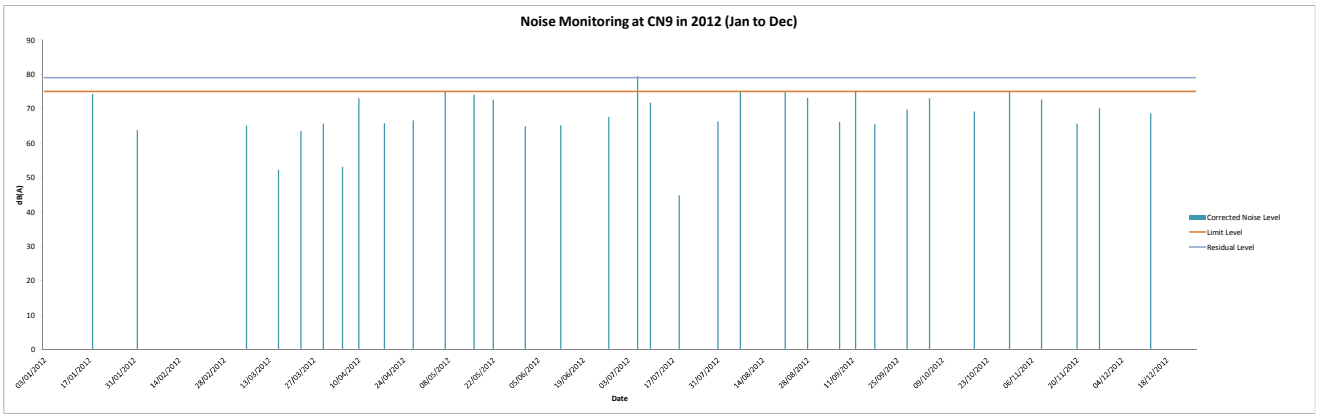

Noise Monitoring at CN8 in 2011 (Jun to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

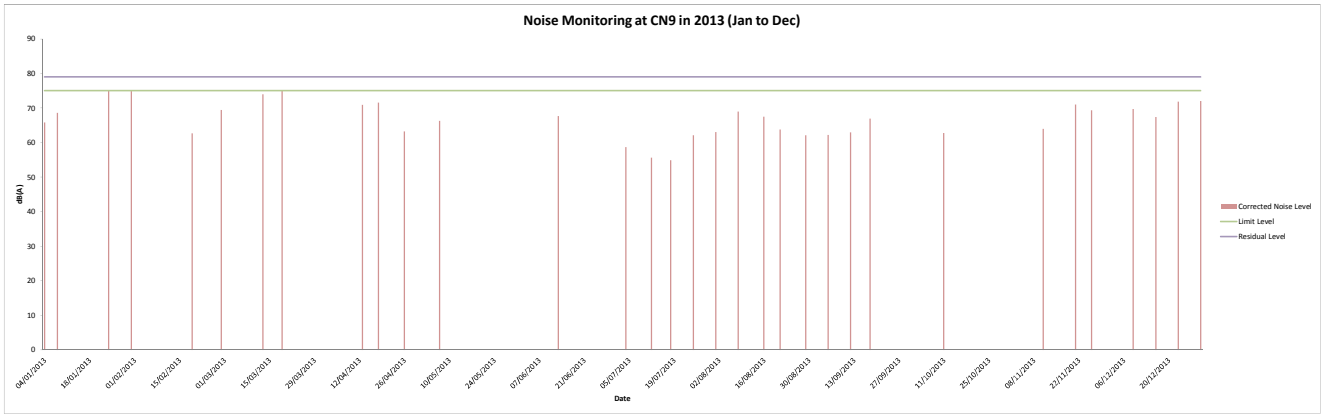

Noise Monitoring at CN8 in 2012 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

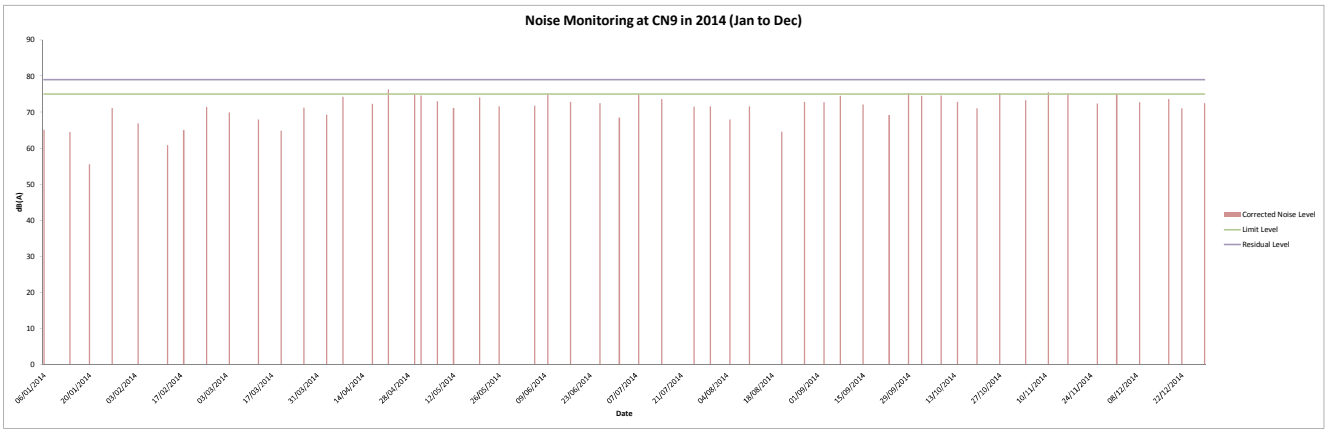

Noise Monitoring at CN8 in 2013 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

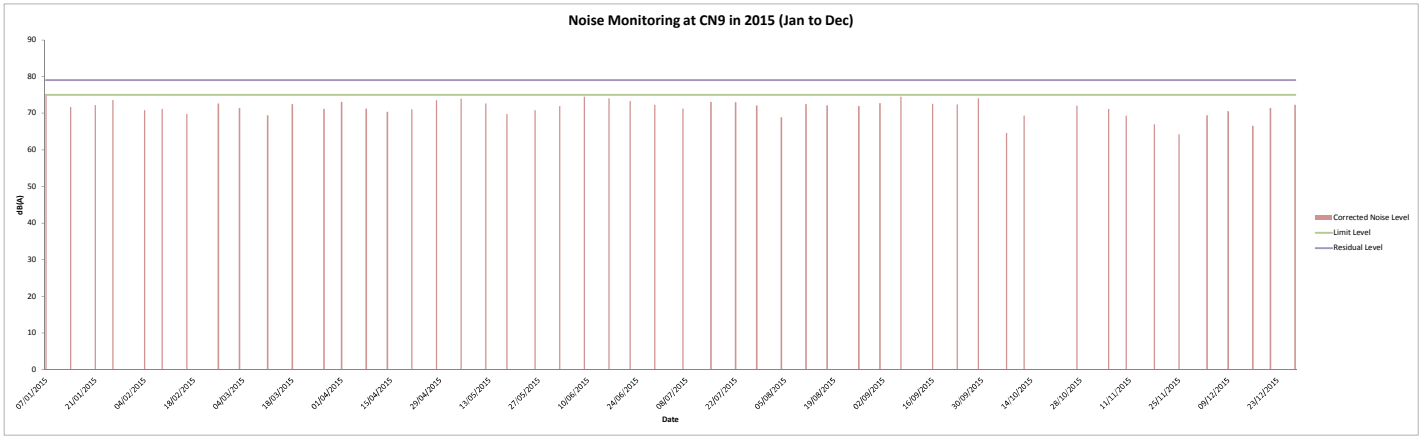

Noise Monitoring at CN8 in 2014 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

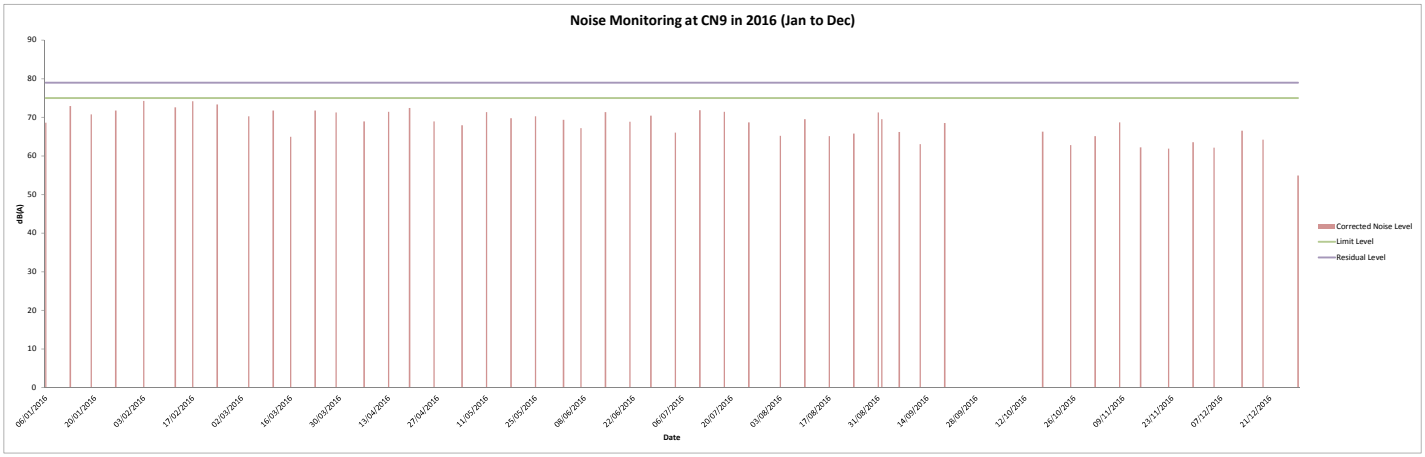

Noise Monitoring at CN9 in 2011 (Jun to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

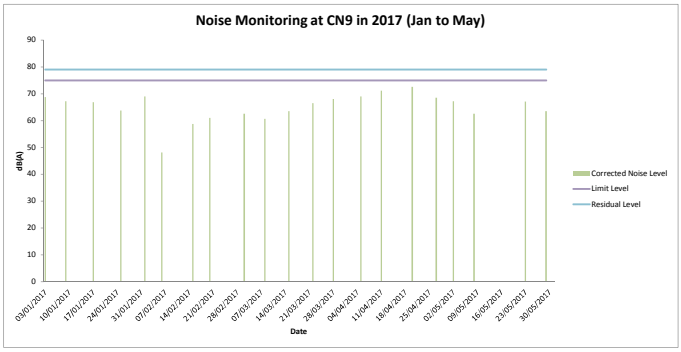

Noise Monitoring at CN9 in 2012 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

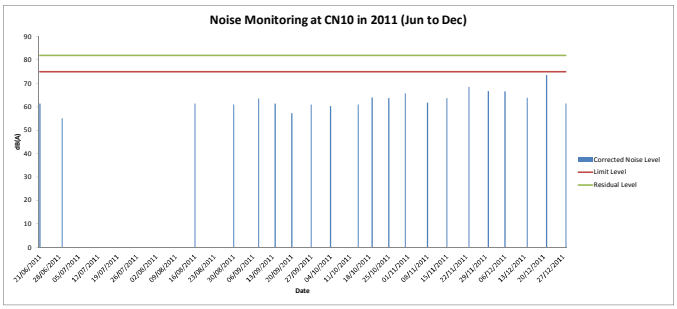

Noise Monitoring at CN9 in 2013 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

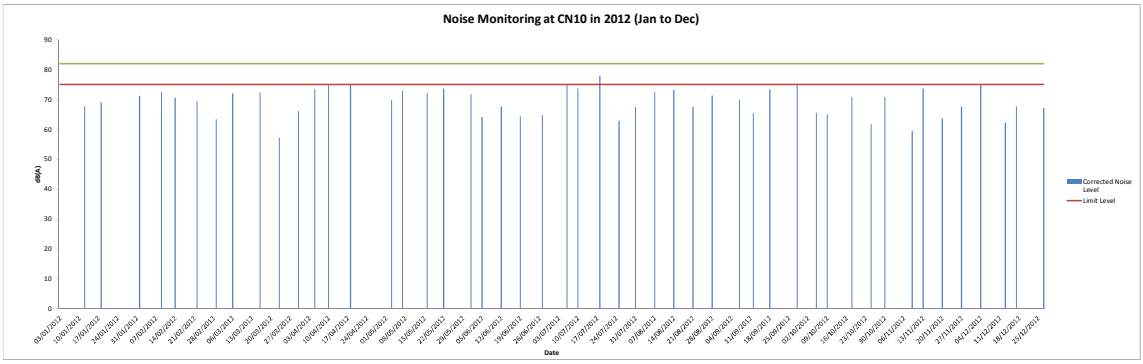

Noise Monitoring at CN9 in 2014 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

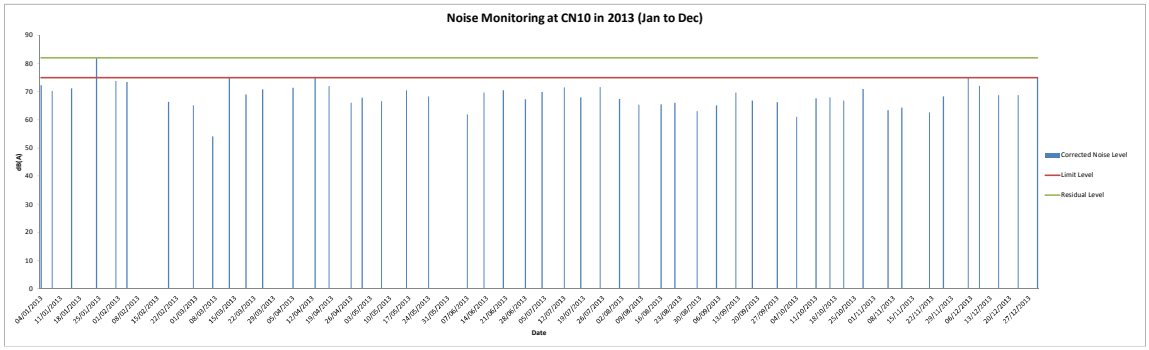

Noise Monitoring at CN9 in 2015 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

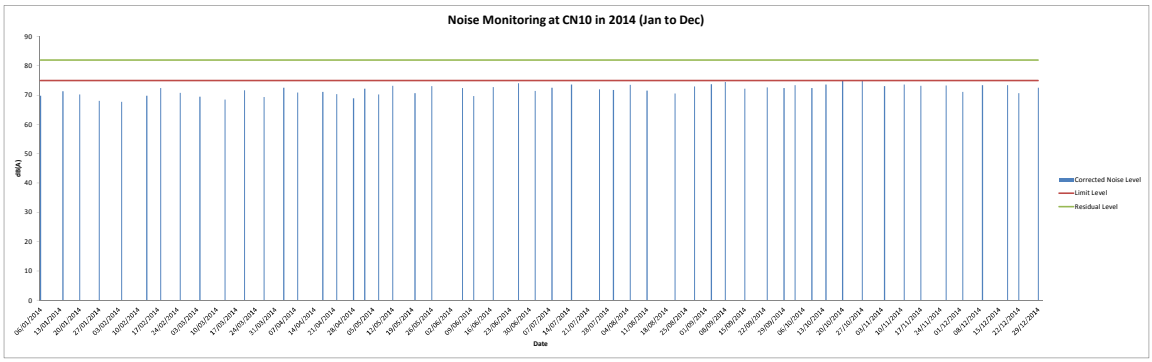

Noise Monitoring at CN9 in 2016 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

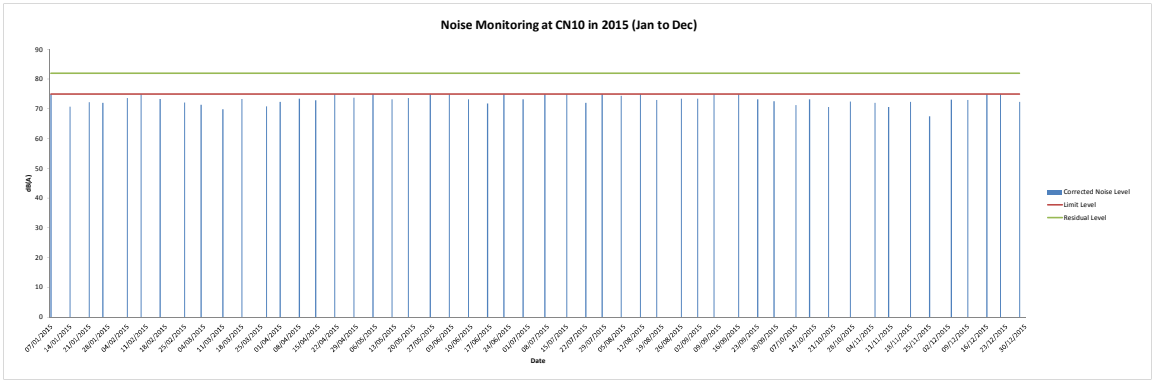

Noise Monitoring at CN9 in 2017 (Jan to May)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

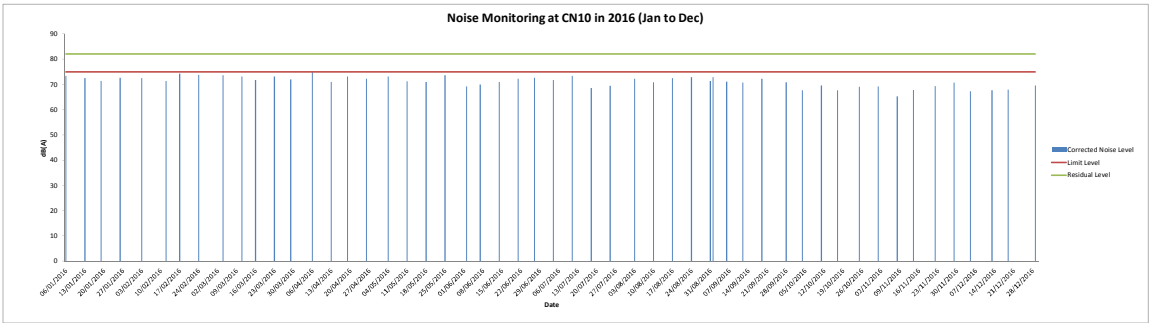

Noise Monitoring at CN10 in 2011 (Jun to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

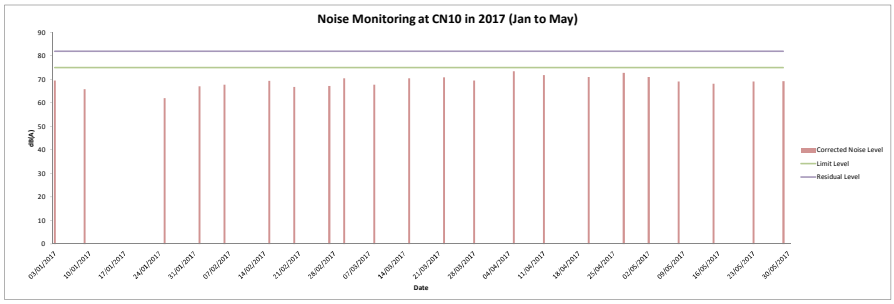

Noise Monitoring at CN10 in 2012 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level

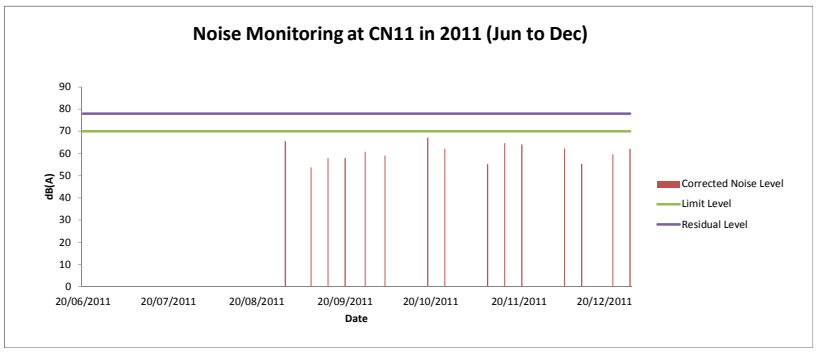

Noise Monitoring at CN10 in 2013 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

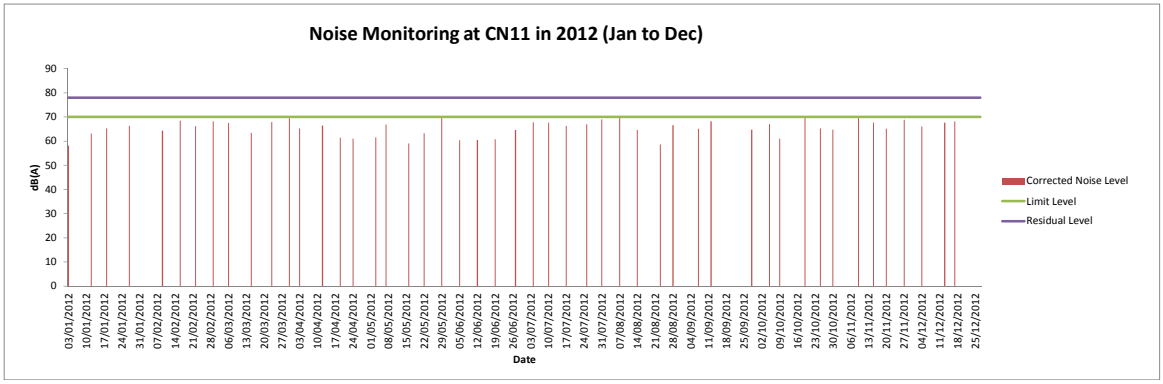

Noise Monitoring at CN10 in 2014 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

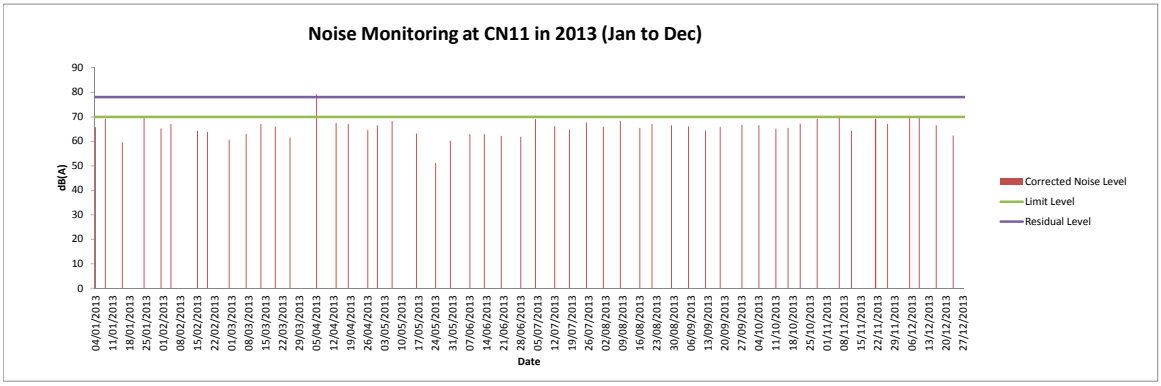

Noise Monitoring at CN10 in 2015 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level


Noise Monitoring at CN10 in 2016 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level


Noise Monitoring at CN10 in 2017 (Jan to May)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level


Noise Monitoring at CN11 in 2011 (Jun to Dec)
dB(A)
90
80
70
60
50
40
30
20
10
0
20/06/2011
20/07/2011
20/08/2011
20/09/2011
20/10/2011
20/11/2011
20/12/2011
Date
Corrected Noise Level
Limit Level
Residual Level


Noise Monitoring at CN11 in 2012 (Jan to Dec)
dB(A)
90
80
70
60
50
40
30
20
10
0
03/01/2012
10/01/2012
17/01/2012
24/01/2012
31/01/2012
07/02/2012
14/02/2012
21/02/2012
28/02/2012
06/03/2012
13/03/2012
20/03/2012
27/03/2012
03/04/2012
10/04/2012
17/04/2012
24/04/2012
01/05/2012
08/05/2012
15/05/2012
22/05/2012
29/05/2012
05/06/2012
12/06/2012
19/06/2012
26/06/2012
03/07/2012
10/07/2012
17/07/2012
24/07/2012
31/07/2012
07/08/2012
14/08/2012
21/08/2012
28/08/2012
04/09/2012
11/09/2012
18/09/2012
25/09/2012
02/10/2012
09/10/2012
16/10/2012
23/10/2012
30/10/2012
06/11/2012
13/11/2012
20/11/2012
27/11/2012
04/12/2012
11/12/2012
18/12/2012
25/12/2012
Date
Corrected Noise Level
Limit Level
Residual Level


Noise Monitoring at CN11 in 2013 (Jan to Dec)
dB(A)
90
80
70
60
50
40
30
20
10
0
04/01/2013
11/01/2013
18/01/2013
25/01/2013
01/02/2013
08/02/2013
15/02/2013
22/02/2013
01/03/2013
08/03/2013
15/03/2013
22/03/2013
29/03/2013
05/04/2013
12/04/2013
19/04/2013
26/04/2013
03/05/2013
10/05/2013
17/05/2013
24/05/2013
31/05/2013
07/06/2013
14/06/2013
21/06/2013
28/06/2013
05/07/2013
12/07/2013
19/07/2013
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02/08/2013
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13/09/2013
20/09/2013
27/09/2013
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01/11/2013
08/11/2013
15/11/2013
22/11/2013
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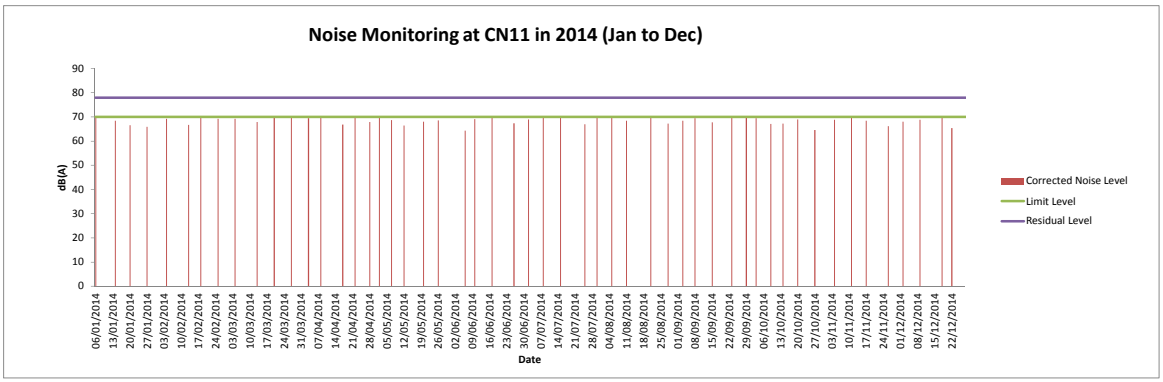
20/12/2013
27/12/2013
Date
Corrected Noise Level
Limit Level
Residual Level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70
60
50
40
30
20
10
0
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13/01/2014
20/01/2014
27/01/2014
03/02/2014
10/02/2014
17/02/2014
24/02/2014
03/03/2014
10/03/2014
17/03/2014
24/03/2014
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07/07/2014
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21/07/2014
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25/08/2014
01/09/2014
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10/11/2014
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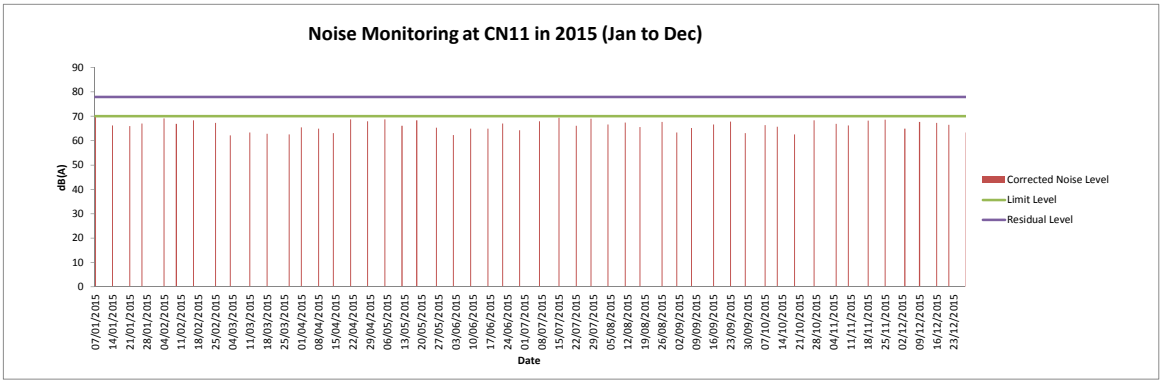
22/12/2014
Date
Corrected Noise Level
Limit Level
Residual Level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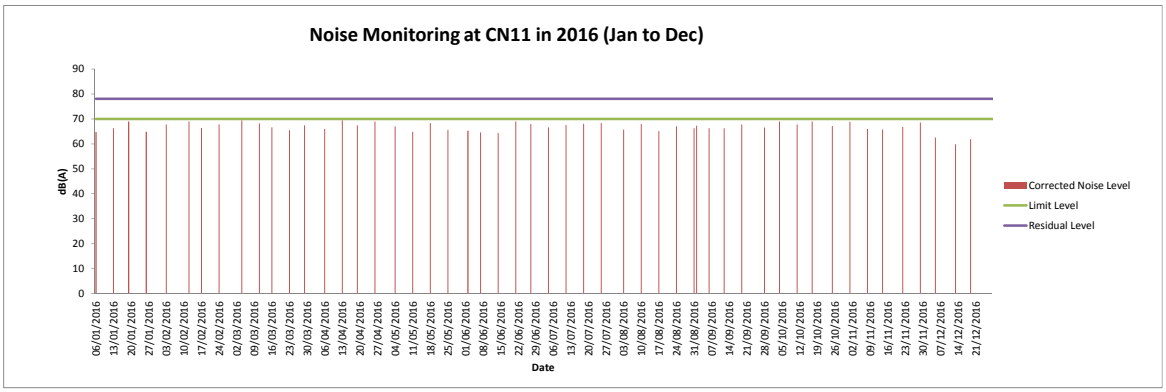
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level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dB(A)
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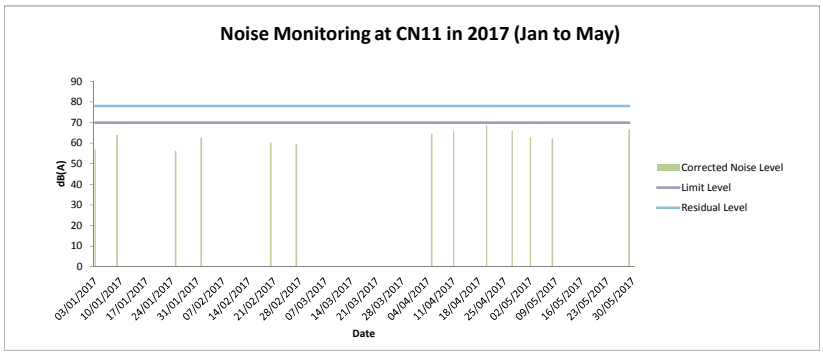
Corrected Noise Level
Limit Level
Residual Level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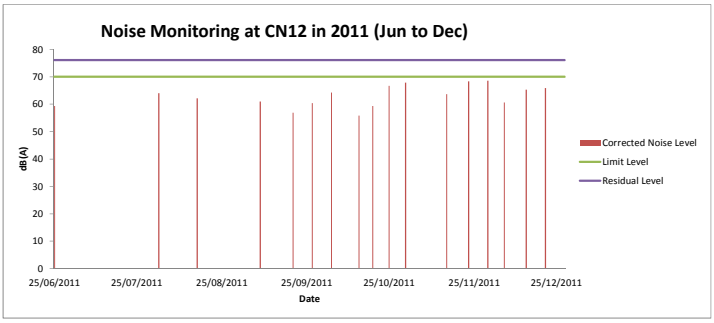
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level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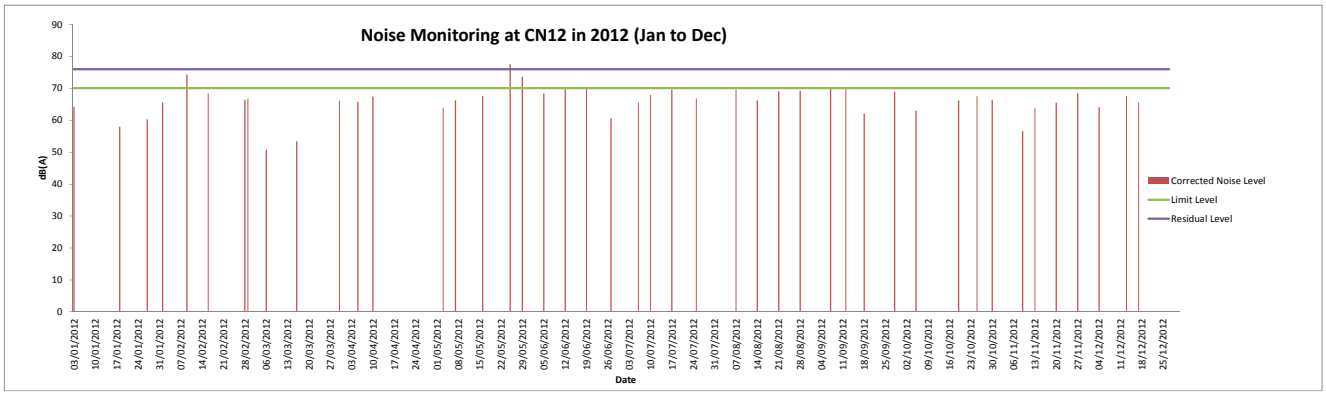
Date
Corrected Noise Level
Limit Level
Residual Level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dB(A)
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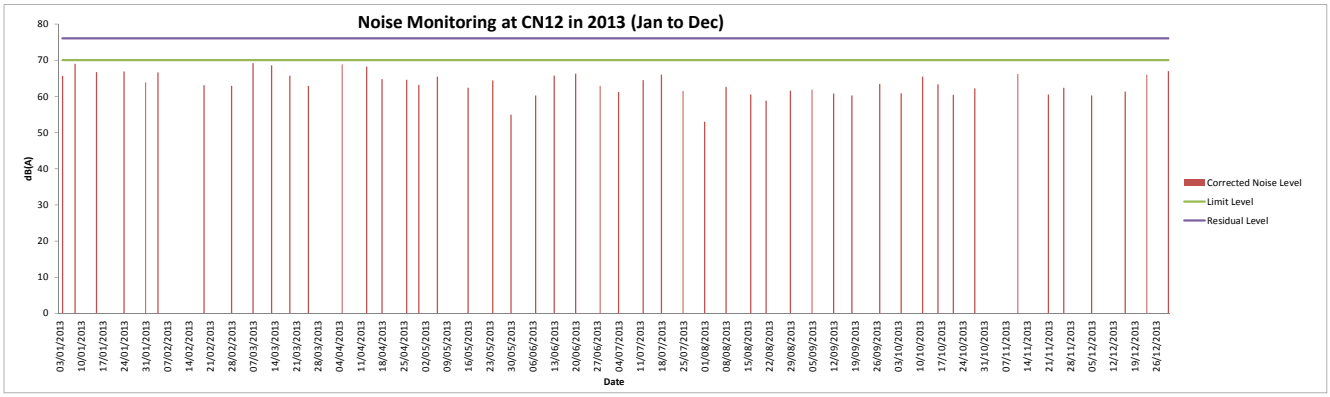
Corrected Noise Level
Limit Level
Residual Level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dB(A)
Date
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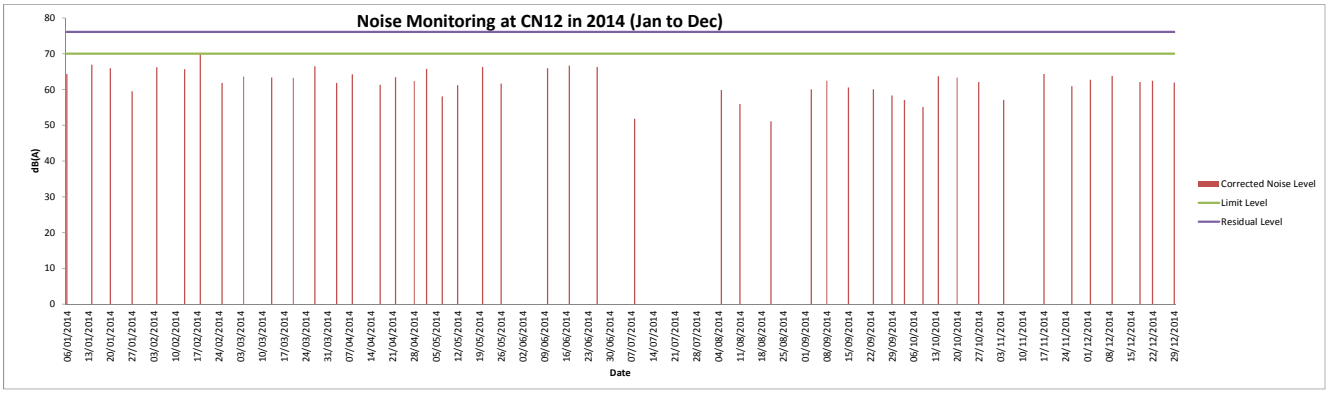
Limit Level
Residual Level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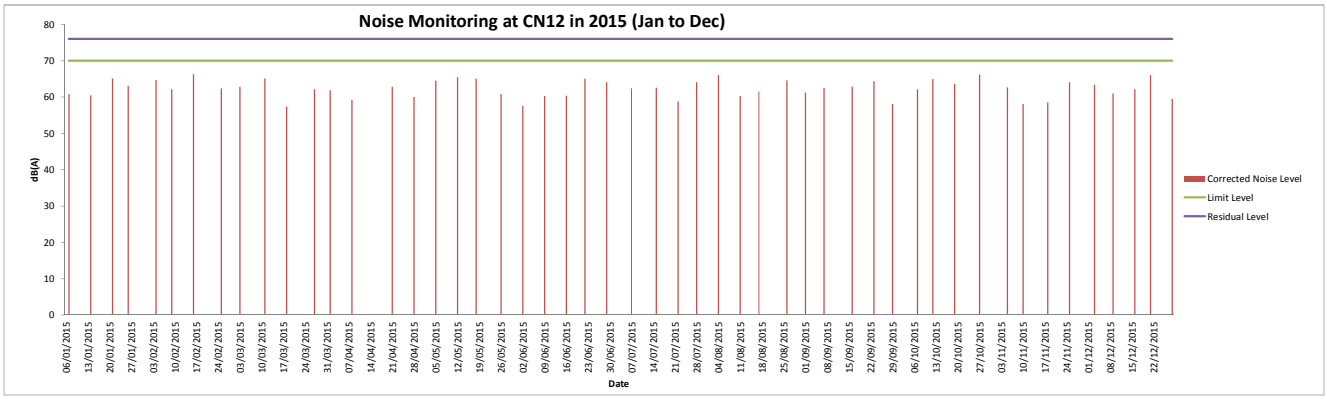
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level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dB(A)
Date
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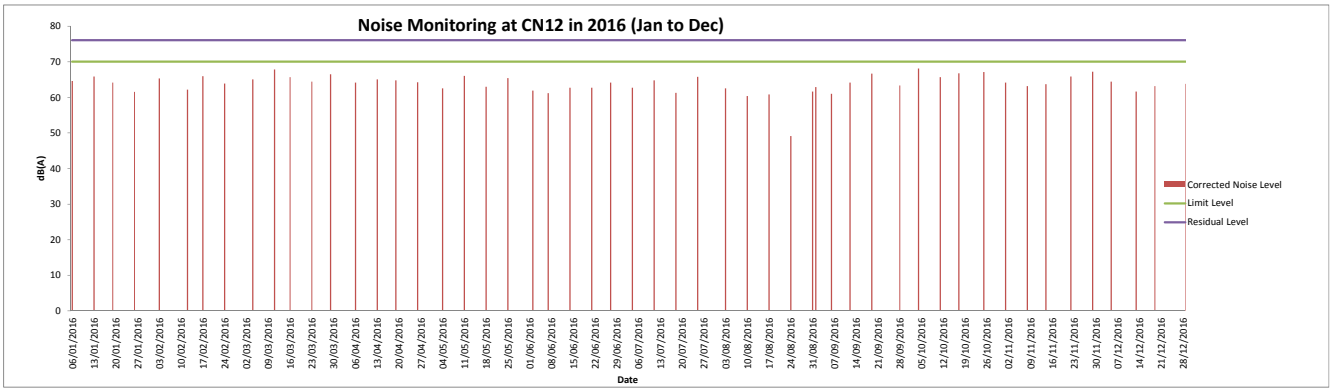
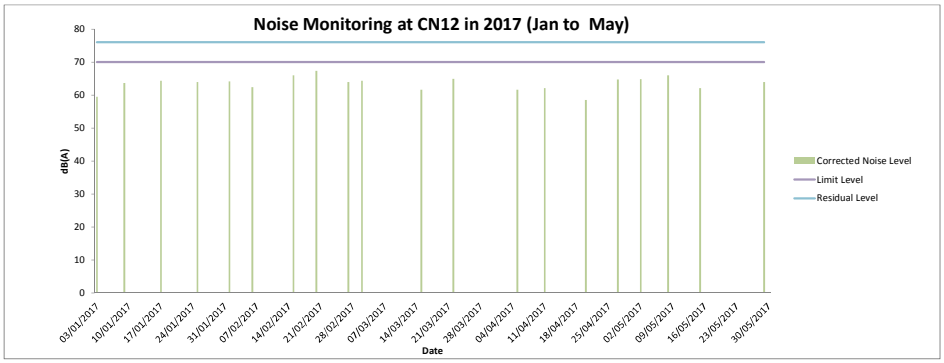
Limit Level
Residual Level


Noise Monitoring at CN12 in 2016 (Jan to Dec)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level


Noise Monitoring at CN12 in 2017 (Jan to May)
dB(A)
Date
Corrected Noise Level
Limit Level
Residual Level

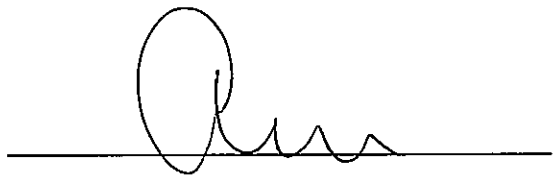
Appendix F

Final EM&A Report (Part 1)

MTR Corporation Limited

Kwun Tong Line Extension (KTE)

Final Environmental Monitoring and Audit Report – Part 1

Verified by: 

Position: Independent Environmental Checker

Date: 18 Nov 2016

MTR Corporation Limited

Kwun Tong Line Extension (KTE)

Final Environmental Monitoring and Audit Report – Part 1

Certified by: _____

Position: Environmental Team Leader

Date: 18 NOV 2016

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Figures and Tables

List of Appendices

EXECUTIVE SUMMARY

The Kwun Tong Line Extension (KTE) Project was awarded to the respective contractors in late May 2011. The EM&A programme for the Kwun Tong Line Extension (KTE) Project commenced on 20 June 2011, the commencement date of construction of the Project.

The passenger service of the KTE has been commenced on 23 October 2016. As all the KTE related works have been completed under Contract 1001 for the Works Sites / Areas of A, B, C, D, E, F, G, J and K before 22 October 2016, this final Environmental Monitoring and Audit (EM&A) Report Part 1 presented the results of EM&A works and the construction impact monitoring during June 2011 to October 2016.

In view of completion of construction works that have the potential to cause significant environmental impact for Contract 1001, all relevant dust and noise monitoring works have been terminated on or before 22 October 2016.

As there would be some remaining road reinstatement and utilities connection works in Whampoa area for Contract 1002, the EM&A programme and regular site inspections would be maintained for this area (i.e. Works Area H, I and L).

Impact monitoring for air quality and noise were conducted in accordance with the EM&A Manual in the reporting period. 7 no. of exceedance to the Action Level at CD6a Site boundary of Finger Pier adjacent to Harbourfront Horizon were recorded in the year of 2012 and 2013. Finding from investigations showed no construction activities were carried out at the works sites related to KTE project. Exceedance was considered not related to KTE project. No exceedance to the Limit Level was recorded.

For noise monitoring, 3 nos. of noise exceedance to the residual level were recorded at CN4 Yee Fu Building in the year of 2011 and 2012 during the rock excavation works at HOM. Relevant actions have been taken by the contractor to control the noise impact in accordance with the recommendations in EIA and EM&A manual.

There was no successful environmental prosecution in the reporting period of June 2011 to October 2016.

Site inspections were conducted by the Environmental Team on a weekly basis to monitor proper implementation of environmental pollution control and mitigation measures for the KTE Project.

There was no non-compliance identified in the reporting period of June 2011 to October 2016 for the KTE Project Works Sites / Areas A, B, C, D, E, F, G, J and K.

An Environmental Permit (EP-399/2010/D), which is being used for the KTE Project, was granted by EPD dated 16 February 2016.

1 INTRODUCTION

1.1 Project Background

MTR Corporation Limited (MTRCL) proposes to build a new railway line, the Kwun Tong Line Extension (KTE), otherwise referred to as 'the Project', which is an extension of the existing Kwun Tong Line from Yau Ma Tei Station to Whampoa area. The route length of the fully underground KTE is approximately 2.6 km with two new stations namely Ho Man Tin Station (HOM) and Whampoa Station (WHA), and a new ancillary ventilation building at Wylie Road.

1.2 Project Programme

The Kwun Tong Line Extension (KTE) Project was awarded to the respective Contractors Nishimatsu Construction Co. Ltd (NCC) and Chun Wo-Hip Hing Joint Venture (CHJV) for construction in late May 2011. The commencement of construction was on 20 June 2011. All the construction works for the railway operation have been completed and the passenger service for KTE has been commenced on 23 October 2016. The remaining construction works of the KTE at Whampoa area under Contract 1002 is expected to be completed in early to mid-2017.

NCC, as the Contractor of Contract 1001, is responsible for the construction of alignment link from the existing Yau Ma Tei Station to Wuhu Street at Whampoa and the new Ho Man Tin Station as well as the ancillary ventilation building at Wylie Road. CHJV, as the Contractor of Contract 1002, is responsible for the construction of the underground Whampoa Station and a platform & overrun tunnel.

1.3 Coverage of the Final EM&A Report – Part 1

The EM&A programme for the Kwun Tong Line Extension (KTE) Project commenced on 20 June 2011. In considering the completion of construction works under Contract 1001, this Final EM&A Report is prepared to present the results of EM&A works and the impact monitoring for the construction works undertaken by contractors during the period of June 2011 to October 2016. Another Final EM&A Report – Part 2 would be submitted in due course after the completion of works in Whampoa area.

2 PROJECT INFORMATION

2.1 Project Management Organization and Contact Details

The KTE Project organization chart is presented in Figure 1. Contacts of key environmental personnel of the Project are shown in Tables 1a and 1b respectively.

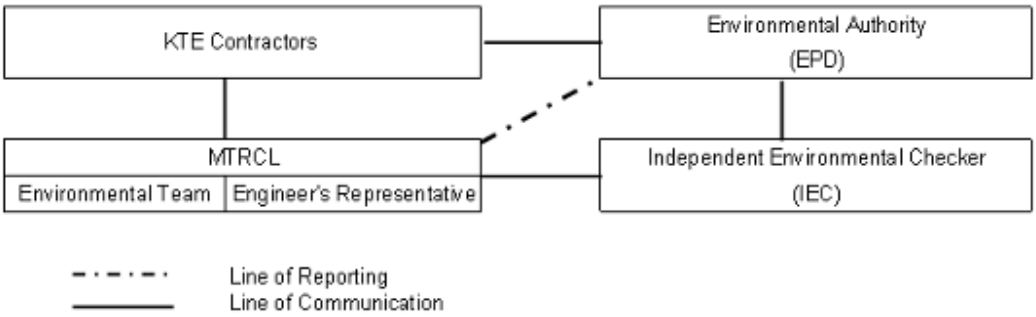


Figure 1. Project Organization

Table 1a Contact List of Key Personnel for Project Management

Organization	Name	Telephone
Engineer's Representative		
Deputy Construction Manager	Oscar Wong	3441 3398
Independent Environmental Checker		
Consultant – Arup	Jacky Chan	3447 6292
Environmental Team		
Environmental Team Leader	Richard Kwan	2688 1179
Contact 1001 Contractor		
Project Manager	Satoshi Endo	6907 8277
Environmental Officer	Ken Wong	6323 6527

Table 1b Contact List of Environmental Authority

Organization	Name	Telephone
Environmental Protection Department		
Sr Env Protection Offr(Metro Assessment) 2	Queenie Ng	2835 1129
Sr Env Protection Offr(Regional E) 6	PS Ng	2150 8002
Sr Env Protection Offr(Regional E) 5	Alfred Ng	2117 7538
Sr Env Protection Offr(Regional E) 4	Aaron Lui	2117 7502

2.2 Project Works Sites and Areas and Environmental Monitoring Locations

The KTE Project works sites and areas are summarized in Table 2 below and shown in

Appendix A Figures 1–3, 5–7 and 9. The locations of environmental monitoring stations are indicated in Appendix A Figures 2, 3, 5-7 and 9. Table 3 shows the details of the active monitoring stations as reported in Sections 3.1 and 3.2.

Table 2 Summary of KTE Project Works Sites and Areas for Contract 1001

Contract 1001 Works Sites and Areas	
Works Site A#5	Gascoigne Road Rest Garden
Works Site B	Underground Tunnel between Yau Ma Tei Station and Wylie Road Ancillary Building
Works Site C #6	Wylie Road Ancillary Building
Works Site D	Underground Tunnel between Wylie Road Ancillary Building and Ho Man Tin Station
Works Site E#7	Ho Man Tin Station
Works Site F#7	Fat Kwong Street Playground
Works Site G	Underground Tunnel between Ho Man Tin Station and Whampoa Station
Works Area J#3	Finger Pier Barging Point
Works Area K#4	Tseung Kwan O Area 137 Magazine Site

Table 3 Summary of Impact Air Quality and Noise Monitoring Stations for Contract 1001

ID	**Monitoring Station**
Air	
CD1a#2 #6	Methodist School
CD2a #1#7	PolyU Homantin Student Halls of Residence
CD3a #7	No. 238 Chatham Road North
CD6a#3	Site boundary of Finger Pier adjacent to Harbourfront Horizon
Noise	
CN1#5	Alhambra Building
CN2#5	Methodist College
CN3a#2 #6	Methodist School
CN4a #1#7	PolyU Homantin Student Halls of Residence
CN5*	Caritas Bianchi College of Careers
CN6 #7	Lok Do Building

Notes:

*: Alternative monitoring locations were proposed in the Alternative Proposal which was submitted on 14 Apr 2011 and agreed by the Environmental Protection Department on 29 Apr 2011. The noise monitoring location at Caritas Bianchi College of Careers, which has been relocated to Tiu Keng Leng with the original premise unoccupied and inaccessible, is suspended until the premises are occupied by similar educational use. No noise monitoring will be conducted for CN5.

#1: Access to the original monitoring stations CD2 and CN4 (Yee Fu Building) has been denied by the management office since December 2012 and MTRCL proposed PolyU Homantin Student Halls of Residence as alternative monitoring stations with no objection from EPD on 28 February 2013.

#2: Access to the original monitoring stations CD1 and CN3 (Queen Elizabeth Hospital – Specialist Clinic) has been denied for demolition since end of July 2013 and MTRC proposed Methodist School at Wylie Road as alternative monitoring stations with no objection from EPD on 4 September 2013.

#3: As all KTE related construction works at Finger Pier was completed by end of December 2013 and the site have been handed over to other project under MTR, the CD6a has been terminated staring from January 2014. EPD has no objection on the termination proposal on 29 January 2014.

#4: All KTE related construction works at TKO Magazine site was completed at the end of December 2014 and the site had been handed over to other project under MTR.

#5: As all KTE related construction works at Gascoigne Road Rest Garden was ended by end January 2016 and the site was handed over to LCSD. Termination proposal for noise monitoring at CN1 and CN2 was submitted to EPD on 1 February 2016 for approval. The termination proposal was approved by EPD on 29 March 2016.

#6: As all KTE related construction works at Wylie Road Ancillary Building (Work Site C) was completed in June 2016, termination proposal for dust monitoring (CD1a) and noise monitoring (CN3a) at Methodist School was submitted to EPD on 18 July 2016. The termination proposal was approved by EPD on 1 August 2016.

#7: As all KTE related construction works at Ho Man Tin Station (Work Site E) and Fat Kwong Street playground (Works Site F) were completed in October 2016, termination proposal for dust monitoring (CD2a / CD3a) and noise monitoring (CN4a / CN6) at PolyU Homantin Student Halls of Residence, No. 238 Chatham Road North and Lok Do Building was submitted to EPD on 17 October 2016. The termination proposal was approved by EPD on 28 October 2016.

2.3 Summary of EM&A Requirements

The EM&A programme mainly requires environmental monitoring for air quality, noise, landscape and visual, water quality and waste management as specified in the EM&A Manual.

A summary of impact EM&A requirements as applicable to this EM&A Report is presented in Table 4 below.

Table 4 Summary of Impact EM&A Requirements

Parameters	Descriptions	Locations	Monitoring Frequencies	Duration
Air Quality	24-hr TSP	Shown in Table 3	Once per 6 days	Construction stage
Noise	$L_{eq(30min)}$	Shown in Table 3	Once a week	Construction stage
Landscape and visual	On-Site Audit	Active Works Sites	Bi-weekly	Construction stage
Waste	On-Site Audit	Active Works Sites	Weekly	Construction stage
Wastewater	On-Site Audit	Active Works Sites	Weekly and in accordance to the discharge licences	Construction stage
General Site Conditions	Environmental Site Inspection	Active Works Sites	Weekly	Construction stage

Environmental Quality Performance Limits for air quality and noise are shown in Appendix B. The Event Action Plan for air quality and noise are shown in Appendix C.

2.4 Implementation of Environmental Mitigation Measures

The KTE Civil Works Contractors are required to implement the mitigation measures as specified in the EP, EIA Report and EM&A Manual. During the regular environmental site inspections, the Contractors' implementation of mitigation measures were inspected and reviewed. A schedule of the implementation of mitigation measures identified in the KTE EIA is given in Appendix D.

2.5 Construction Activities in the Last Reporting Month

Major construction activities carried out by the Civil Contractor in the last reporting period (1 to 22 October 2016) include:

Contract 1001 - Works Sites and Areas

Works Site A (Gascoigne Road Rest Garden)
- All works related to KTE project completed

Works Site B (Underground Tunnel between Yau Ma Tei Station and Wylie Road Ancillary Building)
- All works related to KTE project completed

Works Site C (Wylie Road Ancillary Building)
- All works related to KTE project completed

Works Site D (Underground Tunnel between Wylie Road Ancillary Building and Ho Man Tin Station)
- All works related to KTE project completed

Works Site E (Ho Man Tin Station)

- Landscaping works

Works Site F (Fat Kwong Street Playground)
- All works related to KTE project completed

Works Site G (Underground Tunnel between Ho Man Tin Station and Whampoa Station)
- All works related to KTE project completed

Works Area J (Hung Hom Barging Point)
- All works related to KTE project completed

Works Area K (Tseung Kwan O Area 137 Magazine Site)
- All works related to KTE project completed

3 IMPACT MONITORING

3.1 Air Quality

24-Hour TSP Levels Monitoring

The sampling procedure follows that described in the App. B of Pt 50 in 40CFR Ch.1 (U.S. Environmental Protection Agency). TSP is sampled by drawing air through a conditioned, pre-weighed filter paper inside the high volume sampler at a controlled rate. After 24-hour sampling the filter paper with retained particles is collected and returned to the laboratory for drying in a desiccator followed by weighing. TSP levels are calculated from the ratio of the mass of particulate retained on the filter paper to the total volume of air sampled.

The samplers should be properly maintained. Prior to dust monitoring commencing, appropriate checks should be made to ensure that all equipment and necessary power supply are in good working condition.

Calibration Requirements

The flow rate of the high volume sampler with mass flow controller will be calibrated using an orifice calibrator. Initial calibration (five points) will be conducted upon installation and prior to commissioning. Calibration will be carried out every six months.

Monitoring Results

To examine the construction dust levels, 24-hour TSP monitoring was undertaken according to the EM&A Manual. The dust monitoring locations are shown in the Section 2.2 above.

The statistical analyses of air quality monitoring data for these monitoring stations within the reporting periods are summarized in Table 5 below and the main construction activities in the reporting period and monitoring results are presented in Appendix E as graphical plot.

Table 5 Summary of 24-Hour TSP Levels Monitoring Results

Number of measurement	Average (μg/m3)	Maximum (μg/m3)	Minimum (μg/m3)	Action Level (μg/m3)	Limit Level (μg/m3)
CD1 - Queen Elizabeth Hospital – Specialist Clinic					
122	57.5	154.3	15.7	171	260
CD1a - Methodist School					
153	77.2	162.8	21.5	171	260
CD2 - Yee Fu Building					
87	68	148	18	183	260
CD2a - PolyU Homantin Student Halls of Residence					
212	73	164	14	183	260
CD3a - No. 238 Chatham Road North					
333	58	161	10	192	260
CD6a - Site boundary of Finger Pier adjacent to Harbourfront Horizon					
151	71.4	257.1	12.1	182	260

For CD6a, 7 no. of exceedance to the Action Level at CD6a Site boundary of Finger Pier adjacent to Harbourfront Horizon were recorded in the year of 2012 to 2013.

3.2 Noise

B&K 2250 sound level meters which complied with the International Electrotechnical Commission Publication 651:1979 (Type 1) and 804:1985 (Type 1), specification as referred to in the Technical Memoranda to the NCO were used for the construction noise impact monitoring. The B&K sound level meter and B&K 4231 calibrator are verified by the certified laboratory or manufacturer in biennial basis and annual basis respectively to ensure they perform to the same level of accuracy as stated in the manufacturer's specifications.

Immediately prior to and following each set of measurements at any NSR, the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. If the calibration levels before and after the measurement differs by more than 1.0dB the measurement shall be repeated to obtain a reliable result. Periods of prolonged or repeated overloading of the sound level meter detector were avoided by setting the meter with adequate headroom prior to commencing measurements. Measurements were recorded to the nearest whole dB, with values of 0.5 or more being rounded up.

Impact noise monitoring of $L_{Aeq(30min)}$ was undertaken to measure construction noise levels in accordance with the EM&A Manual. The noise monitoring locations are shown in Section 2.2 above.

The statistical analysis of noise monitoring data for these monitoring stations within the reporting period are summarized in Table 6 below and the major construction activities in the reporting period and monitoring results are presented in Appendix E as graphical plot.

Table 6 Statistical Analysis of Noise Monitoring Data

Number of measurement	Average (dBA)	Maximum (dBA)	Minimum (dBA)	Limit Level (dBA)	Residual Level (dBA)
CN1 - Alhambra Building					
242	65	71	56	75	NA
CN2 - Methodist College					
242	65	70	53	70	75
CN3 - Queen Elizabeth Hospital – Specialist Clinic					
109	63	73	47	75	NA
CN3a - Methodist School					
150	67	70	58	70	NA
CN4 - Yee Fu Building					
78	72	83	32	75	77
CN4a - PolyU Homantin Student Halls of Residence					
202	71	75	64	75	NA
CN6 - Lok Do Building					
282	66	72	58	75	NA

3 nos. of noise exceedance to the residual level were recorded at CN4 Yee Fu Building in the year of 2011 and 2012.

3.3 Action taken in Event of Exceedance

Exceedance to the Action Level at CD6a Site boundary of Finger Pier adjacent to Harbourfront Horizon were recorded in the year of 2012 and 2013. Finding from investigations showed no construction activities were carried out at the works sites related to KTE project. Exceedance was considered not related to KTE project. No exceedance to the Limit Level was recorded.

For noise monitoring, noise exceedance were recorded in the year of 2011 and 2012 during the rock excavation works at HOM. Relevant actions have been taken by the contractors to control the noise impact in accordance with the recommendations in EIA and EM&A manual. No other noise exceedance was recorded after the completion of rock excavation works. The exceedance cases were reported in respective EM&A reports in 2011 and 2012.

3.4 Noise Commissioning Test

Operational fixed plant noise and ground-borne noise commissioning test were conducted before KTE operation in accordance with EM&A Manual requirement. All commissioning test results comply with relevant criteria. The Operation Ground-borne Noise Performance Test Report and Noise Audit Report to Confirm the Compliance of Design of Fixed Plant Noise Source were approved by EPD on 6 September 2016 and 4 October 2016 respectively.

4 LANDSCAPE AND VISUAL

4.1 Monitoring Requirements

Monitoring of the implementation of the landscape and visual mitigation measures during construction phase was conducted in accordance with the requirements as stipulated in the EM&A Manual.

The landscape and visual monitoring and audit had been conducted once every two weeks throughout the construction stage.

4.2 Audit Results

Monitoring and audit was undertaken in accordance with the EM&A Manual.

The Registered Landscape Architect of Environmental Team or his representatives conducted landscape and visual audits for implementation of the landscape and visual mitigation measures during construction phase. No non-compliance was identified in the reporting period.

5 WASTE MANAGEMENT

Mitigation measures on waste management had been implemented in accordance with the requirements of the EM&A Manual. Suitable C&D materials were reused on-site or at other projects such as Andersen Road Quarry while the remaining C&D materials and non-inert wastes were disposed at the public filling reception facilities and the landfills respectively. The quantities disposed during construction period of KTE Contract 1001 are summarized in the following table:

Table 7 Statistics of Wastes Disposal from KTE

Amount of Construction Wastes Disposed				
Reporting Period	Inert C&D Materials to Public Fill (m^3)	Inert C&D Materials Reused (m^3)	Non-inert Waste to Landfill (m^3)	Chemical Waste to designated treatment facility (trips)
Contract 1001				
Jun -Dec 2011	28690	24768	714	0
Jan-Dec 2012	40393	415640	1614	2
Jan – Dec 2013	75176	317190	2544	7
Jan – Dec 2014	43825	142474	7692	5
Jan – Dec 2015	38687	4172	14088	0
Jan – Oct 2016	11950	0	6882	3
Total	238721	904244	33534	17

6 WATER QUALITY

Monitoring of the implementation of the water quality mitigation measures during construction phase was conducted in accordance with the requirements as stipulated in the EM&A Manual.

Weekly site inspection was conducted throughout the construction stage covering the entire project site areas to ensure the recommended mitigation measures are properly implemented.

In the reporting period, the water quality mitigation measures were implemented in accordance with the requirements as stipulated in the EM&A Manual and found in an acceptable manner.

7 RECORD OF ENVIRONMENTAL COMPLAINTS

Total 23 cases of environmental complaints were received in the reporting period for Contract 1001 areas. 15 of them are classified as invalid and 8 of them are classified as valid complaints after investigations. The complaints had been handled in accordance with the requirements specified in the EM&A Manual. The ET had provided feasible solutions to the ER and Contractors in mitigating the environmental disturbances/concerns lodged by the complainants. All complaint cases had been resolved and closed. Details of the environmental complaints including investigation and follow-up actions can be referenced in the respective Monthly EM&A Reports. A complaint summary for Contract 1001 is shown in below tables.

Reporting Period	Invalid Complaint			
	Contract	Frequency	Nature	Status
Sep-11	1001	1	Noise	Closed
Dec-11	1001	1	Water	Closed
Feb-12	1001	1	Noise	Closed
Mar-12	1001	1	Noise	Closed
Jun-12	1001	1	Noise & Dust	Closed
Jun-12	1001	1	Noise & Dust	Closed
Jun-12	1001	1	Noise & Dust	Closed
Sep-12	1001	1	Air	Closed
Oct-12	1001	1	Noise	Closed
Mar-13	1001	1	Noise	Closed
Mar-14	1001	1	Noise	Closed
May-14	1001	1	Noise	Closed
Sep-14	1001	1	Dust	Closed
Nov-14	1001	1	Air	Closed
Apr-15	1001	1	Air	Closed

Reporting Period	Valid Complaint			
	Contract	Frequency	Nature	Status
Mar-12	1001	1	Noise	Closed
Apr-12	1001	1	Noise	Closed
Nov-12	1001	1	Noise	Closed
Jan-13	1001	1	Visual	Closed
May-14	1001	1	Fume	Closed
Jun-14	1001	1	Fume	Closed
Jul-14	1001	1	Fume	Closed
Feb-15	1001	1	Visual	Closed

8 RECORD OF NON-COMPLIANCES

There was no non-compliance identified in the construction period of KTE Contractor 1001 for Works area A, B, C, D, E, F, G, J and K.

9 NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

No summon or prosecution related to environmental issue was recorded in the construction period of KTE Contractor 1001 for Works area A, B, C, D, E, F, G, J and K.

10 STATUS OF STATUTORY SUBMISSIONS

10.1 Submissions required under Environmental Permit

A summary of the status of submissions required under the KTE Environmental Permit as of October 2016 is shown below:

Table 10 Summary of Submissions in accordance with EP Conditions

EP-399/2010/C Part C Clause No.	Description		Status
1.12	1	Notification of commencement of construction	Submitted on 17 May 2011
2.1	2	Establishment of ET with ET Leader	Submitted on 1 Apr2011
2.1	3	Establishment of Registered Landscape Architect	Submitted on 14 Apr 2011
2.2	4	Employment of IEC	Submitted on 1 Apr 2011 and 7 Jul 2011
2.3	5	Notification of the management organization of main construction companies and/or any form of JV	Submitted on 19 May 2011
2.4	6	Layout drawings with explanatory statement, showing Project boundary, alignment and associated work areas and works sites locations	Submitted on 10 Jun 2011 and 13 Jul 2011
2.5	7	Notification of setting up hotline to service complaints, comments, suggestions or requests for information	Submitted on 12 May 2011
3.7	8	Report any contamination hotspot(s) identified from the reconnaissance site visit to the kerosene store at Chung Hau Street	Submitted on 25 Jul 2011
5.3	9	Submission of Baseline Monitoring Report	Submitted on 4 May 2011 and 8 Jul 2011
6.2	10	Notification of Internet address to place EM&A data	Submitted on 1 Aug 2011
5.4	11	Monitoring Report for July 2011	Submitted on 12 Aug 2011
5.4	12	Monitoring Report for August 2011	Submitted on 15 Sep 2011
5.4	13	Monitoring Report for September 2011	Submitted on 17 Oct 2011
4.1	14	Review Plan for Operational Groundborne Noise	Submitted on 28 Oct 2011
5.4	15	Monitoring Report for October 2011	Submitted on 14 Nov 2011
5.4	16	Monitoring Report for November 2011	Submitted on 14 Dec 2011
5.4	17	Monitoring Report for December 2011	Submitted on 16 Jan 2012
5.4	18	Monitoring Report for January 2012	Submitted on 14 Feb 2012
4.1	19	Review Plan for Operational Groundborne Noise	Submitted on 29 Feb 2012
5.4	20	Monitoring Report for February 2012	Submitted on 14 Mar 2012
5.4	21	Monitoring Report for March 2012	Submitted on 17 Apr2012
4.1	22	Review Plan for Operational Groundborne Noise	Submitted on 27 Apr 2012
5.4	23	Monitoring Report for April 2012	Submitted on 15 May 2012
3.7	24	Further Inspection to the Kerosene Store	Submitted on 8 Jun 2012
5.4	25	Monitoring Report for May 2012	Submitted on 14 Jun 2012
2.4	26	Update of Layout drawings with explanatory statement, showing Project boundary, alignment and associated work areas and works sites locations	Submitted on 13 Jul 2012

5.4	27	Monitoring Report for Jun 2012	Submitted on 16 Jul 2012
5.4	28	Monitoring Report for Jul 2012	Submitted on 14 Aug 2012
4.9	29	Landscape and Visual Plan Part 1: Tseung Kwan O Area 137 Magazine Site	Submitted on 27 Aug 2012
5.4	30	Monitoring Report for Aug 2012	Submitted on 14 Sep 2012
5.4	31	Monitoring Report for Sep 2012	Submitted on 16 Oct 2012
4.9	32	Landscape and Visual Plan Part 1: Tseung Kwan O Area 137 Magazine Site Rev. A	Submitted on 24 Oct 2012
5.4	33	Monitoring Report for Oct 2012	Submitted on 14 Nov 2012
5.4	34	Monitoring Report for Nov 2012	Submitted on 14 Dec 2012
5.4	35	Monitoring Report for Dec 2012	Submitted on 14 Jan 2013
5.4	36	Monitoring Report for Jan 2013	Submitted on 19 Feb 2013
5.1	37	Proposal of Alternative Monitoring Locations from MTRCL	Submitted on 26 Feb 2013
5.4	38	Monitoring Report for Feb 2013	Submitted on 14 Mar 2013
5.4	39	Monitoring Report for Mar 2013	Submitted on 16 Apr 2013
5.4	40	Monitoring Report for April 2013	Submitted on 15 May 2013
5.4	41	Monitoring Report for May 2013	Submitted on 17 Jun 2013
2.1	42	Replacement of Registered Landscape Architect	Submitted on 3 Jul 2013
5.4	43	Monitoring Report for June 2013	Submitted on 15 Jul 2013
5.4	44	Monitoring Report for July 2013	Submitted on 14 Aug 2013
5.1	45	Proposal of Alternative Monitoring Locations from MTRCL	Submitted on 16 Aug 2013
5.4	46	Monitoring Report for August 2013	Submitted on 13 Sep 2013
5.4	47	Monitoring Report for September 2013	Submitted on 16 Oct 2013
5.4	48	Monitoring Report for October 2013	Submitted on 14 Nov 2013
5.4	49	Monitoring Report for November 2013	Submitted on 13 Dec 2013
5.4	50	Monitoring Report for December 2013	Submitted on 15 Jan 2014
5.1	51	Proposal for Termination of TSP Monitoring at CD6a Harbourfront Horizon	Submitted on 15 Jan 2014
5.4	52	Monitoring Report for January 2014	Submitted on 17 Feb 2014
5.4	53	Monitoring Report for February 2014	Submitted on 14 Mar 2014
4.1	54	Operational Groudborne Noise Review Plan	Submitted on 20 Mar 2014
4.2	55	Operational Groundborne Noise Review Report – Phase 1	Submitted on 20 Mar 2014
5.4	56	Monitoring Report for March 2014	Submitted on 14 Apr 2014
5.4	57	Monitoring Report for April 2014	Submitted on 19 May 2014
5.4	58	Monitoring Report for May 2014	Submitted on 16 Jun2014
5.4	59	Monitoring Report for June 2014	Submitted on 15 Jul 2014

5.4	60	Monitoring Report for July 2014	Submitted on 14 Aug 2014
2.1	61	Replacement of Registered Landscape Architect	Submitted on 28 Aug 2014
5.4	62	Monitoring Report for August 2014	Submitted on 16 Sep 2014
5.4	63	Monitoring Report for September 2014	Submitted on 16 Oct 2014
4.2	64	Operational Groundborne Noise Review Report – Phase 1 and Phase 2	Submitted on 6 Nov 2014
5.4	65	Monitoring Report for October 2014	Submitted on 14 Nov 2014
5.4	66	Monitoring Report for November 2014	Submitted on 12 Dec 2014
4.2	67	Operational Groundborne Noise Review Report – Phase 1 and Phase 2 – Resubmission	Submitted on 7 Jan 2015
5.4	68	Monitoring Report for December 2014	Submitted on 15 Jan 2015
5.4	69	Monitoring Report for January 2015	Submitted on 13 Feb 2015
5.4	70	Monitoring Report for February 2015	Submitted on 13 Mar 2015
5.4	71	Monitoring Report for March 2015	Submitted on 17 Apr 2015
5.4	72	Monitoring Report for April 2015	Submitted on 15 May 2015
5.4	73	Monitoring Report for May 2015	Submitted on 12 Jun 2015
5.4	74	Monitoring Report for Jun 2015	Submitted on 15 Jul 2015
4.9	75	Landscape and Visual Plan Part 2: Gascoigne Road Rest Garden	Submitted on 7 Aug 2015
5.4	76	Monitoring Report for Jul 2015	Submitted on 14 Aug 2015
5.4	77	Monitoring Report for Aug 2015	Submitted on 14 Sep 2015
4.9	78	Landscape and Visual Plan Part 3: Wylie Road Ancillary Building	Submitted on 24 Sep 2015
5.4	79	Monitoring Report for Sep 2015	Submitted on 15 Oct 2015
5.4	80	Monitoring Report for Oct 2015	Submitted on 13 Nov 2015
4.3	81	As-built Drawings for Noise Mitigation Measures	Submitted on 20 Nov 2015
5.4	82	Monitoring Report for Nov 2015	Submitted on 14 Dec 2015
4.9	83	Landscape and Visual Plan Part 3: Wylie Road Ancillary Building (Revision A)	Submitted on 16 Dec 2016
5.4	84	Monitoring Report for Dec 2015	Submitted on 15 Jan 2016
5.1	85	Proposal for Termination of Monitoring Station CN1 Alhambra Building and CN2 Methodist College	Submitted on 1 Feb 2016
5.4	86	Monitoring Report for Jan 2016	Submitted on 17 Feb 2016
5.4	87	Monitoring Report for Feb 2016	Submitted on 11 Mar 2016
5.1	88	Proposal of Alternative Operational Ground-Borne Noise Monitoring Location from MTRCL	Submitted on 14 Mar 2016
5.4	89	Monitoring Report for Mar 2016	Submitted on 15 Apr 2016
4.9	90	Landscape and Visual Plan Part 4: Ho Man Tin Station (HOM)	Submitted on 6 May 2016
5.4	91	Monitoring Report for Apr 2016	Submitted on 16 May 2016
4.8	92	KTE Tunnel Water-tight Liner Audit Report	Submitted on 7 Jun 2016
5.4	93	Monitoring Report for May 2016	Submitted on 15 Jun 2016
5.4	94	Monitoring Report for June 2016	Submitted on 15 Jul 2016
5.1	95	Proposal for Termination of Monitoring Station CD1a and CN3a at Methodist School	Submitted on 18 Jul 2016
4.4	96	Operational Ground-borne Noise Performance Test Report	Submitted on 25 Jul 2016
4.9	97	Landscape and Visual Plan Part 2: Gascoigne Road Rest Garden (Revision A)	Submitted on 29 Jul 2016
4.9	98	Landscape and Visual Plan Part 5: Whampoa Station (WHA)	Submitted on 4 Aug 2016
5.4	99	Monitoring Report for Jul 2016	Submitted on 12 Aug 2016
4.9	100	Landscape and Visual Plan Part 2: Gascoigne Road Rest Garden (Revision B)	Submitted on 22 Aug 2016

4.6	101	Proposal for updating Maximum Sound Power Level for Fixed Plant Noise Sources	Submitted on 26 Aug 2016
4.4	102	Operational Ground-borne Noise Performance Test Report (Revision A)	Submitted on 30 Aug 2016
4.6	103	Noise Audit Report to Confirm the compliance of Design of Fixed Plant Noise Sources	Submitted on 31 Aug 2016
1.14	104	Notification of Commencement Date of Operation of KTE	Submitted on 2 September 2016
5.4	105	Monitoring Report for Aug 2016	Submitted on 14 September 2016
1.14	106	Notification of Commencement Date of Operation of KTE	Submitted on 22 September 2016
5.4	107	Monitoring Report for Sep 2016	Submitted on 17 October 2016
5.1	108	Proposal for Termination of Dust and Noise Monitoring Stations at PolyU Ho Man Tin Student Halls of Residence, No. 238 Chatham Road and Lok Do Building	Submitted on 17 October 2016
4.9	109	Landscape and Visual Plan Part 6: Fat Kwong Street Playground – Revision A (October 2016)	Submitted on 20 October 2016
4.9	110	Landscape and Visual Plan Part 5: Whampoa Station (WHA) –Revision A (October 2016)	Submitted on 28 October 2016
5.4	111	Monitoring Report for Oct 2016	Submitted on 14 November 2016

11 SITE INSPECTIONS

11.1 Observations

Regular site inspections led by the Engineer’s Representative and anticipated by ET and respective Contractors were undertaken in accordance with the EM&A Manual in the reporting period. The contractors' performance on environmental matters were assessed and found in an acceptable manner. The inspection findings and the associated recommendations on improvement to the environmental protection and pollution control works were raised to the contractors for reference and/ or action. It is concluded that the environmental protection and pollution control works had been implemented satisfactorily.

11.2 Other Notable Events

KTE Operation

Operation of KTE has been commenced on 23 October 2016.

IEC Site Inspections

The IEC conducted site inspection for KTE project works areas on monthly basis. Observations, if any, were noted during the site inspections and the respective Contractors had followed up the issues as identified in the site inspections in a responsible manner.

Remaining works in Whampoa Area

As there would be some remaining road reinstatement and utilities connection works for Whampoa area for Contract 1002, the EM&A programme and regular site inspection would be maintained for this area (i.e. Works Area H, I and L)..

Termination of KTE EM&A programme for Contract 1001

As all the KTE related works have been completed under Contract 1001 for the Works Sites / Areas of A, B, C, D, E, F, G, J and K, this final Environmental Monitoring and Audit (EM&A) Report Part 1 presented the results of EM&A works and the construction impact monitoring during June 2011 to October 2016.

In view of completion of construction works that have the potential to cause significant environmental impact for Contract 1001, all relevant dust and noise monitoring works have been proposed to be terminated on or before 22 October 2016.

12 FUTURE KEY ISSUES

12.1 Key Issues for the Coming Month

As all the construction works that have the potential to cause significant environmental impact have been completed for areas under Contract 1001, no environmental issues would be anticipated.

12.2 Effectiveness and Efficiency of Mitigation Measures

Based on the environmental monitoring results of the reporting period, the effectiveness and efficiency of the mitigation measures implemented were found to be satisfactory. It is concluded that the environmental mitigation measures as recommended in the approved KTE Project EIA Report had been implemented satisfactorily.

12.3 Review of KTE EIA Predictions

The environmental impact hypotheses with respect to construction air quality and

construction noise detailed in the KTE EIA Report had been tested throughout the construction stage of the KTE Project by the regular construction impact monitoring. The environmental impact hypotheses are found to be in order generally throughout the construction stage of the KTE Project.

Based on the findings of the regular construction impact monitoring, the validity of the KTE EIA predictions can be concluded. In conclusion, the current practices regarding the performance of the environmental management system are found to be satisfactory and should be maintained.

13 CONCLUSIONS

The passenger service of the KTE has been commenced on 23 October 2016. As all the KTE related works have been completed under Contract 1001 for the Works Sites / Areas of A, B, C, D, E, F, G, J and K, this final Environmental Monitoring and Audit (EM&A) Report Part 1 presented the results of EM&A works and the impact monitoring for the construction works for the period of June 2011 to October 2016.

In view of completion of construction works that have the potential to cause significant environmental impact for Contract 1001, all relevant dust and noise monitoring works have been proposed to be terminated on or before 22 October 2016.

As there would be some remaining road reinstatement and utilities connection works for Whampoa area for Contract 1002, the EM&A programme and regular site inspection would be maintained for this area.

Impact monitoring for air quality and noise were conducted in accordance with the EM&A Manual in the reporting period. 7 no. of exceedance to the Action Level at CD6a Site boundary of Finger Pier adjacent to Harbourfront Horizon were recorded in the year of 2012 and 2013. Finding from investigations showed no construction activities were carried out at the works sites related to KTE project. Exceedance was considered not related to KTE project. No exceedance to the Limit Level was recorded.

For noise monitoring, 3 nos. of noise exceedance to the residual level were recorded at CN4 Yee Fu Building in the year of 2011 and 2012 during the rock excavation works at HOM. Relevant actions have been taken by the contractor to control the noise impact in accordance with the recommendations in EIA and EM&A manual.

There was no successful environmental prosecution in the reporting period of June 2011 to October 2016.

Site inspections were conducted by the Environmental Team on a weekly basis to monitor proper implementation of environmental pollution control and mitigation measures for the KTE Project.

There was no non-compliance identified in the reporting period of June 2011 to October 2016 for the KTE Project Works Sites / Areas A, B, C, D, E, F, G, J and K.

It is concluded from the environmental monitoring and audit works for the Kwun Tong Line Extension Project were undertaken in a responsible manner. The environmental protection and pollution control measures provided the contractors were generally acceptable apart from some minor irregularities which were rectified timely by the respective civil works contractors.

Appendix A

Figures – Works Sites / Area and Location of Monitoring Station for Contract 1001

Figure 1. KTE Project Works Area

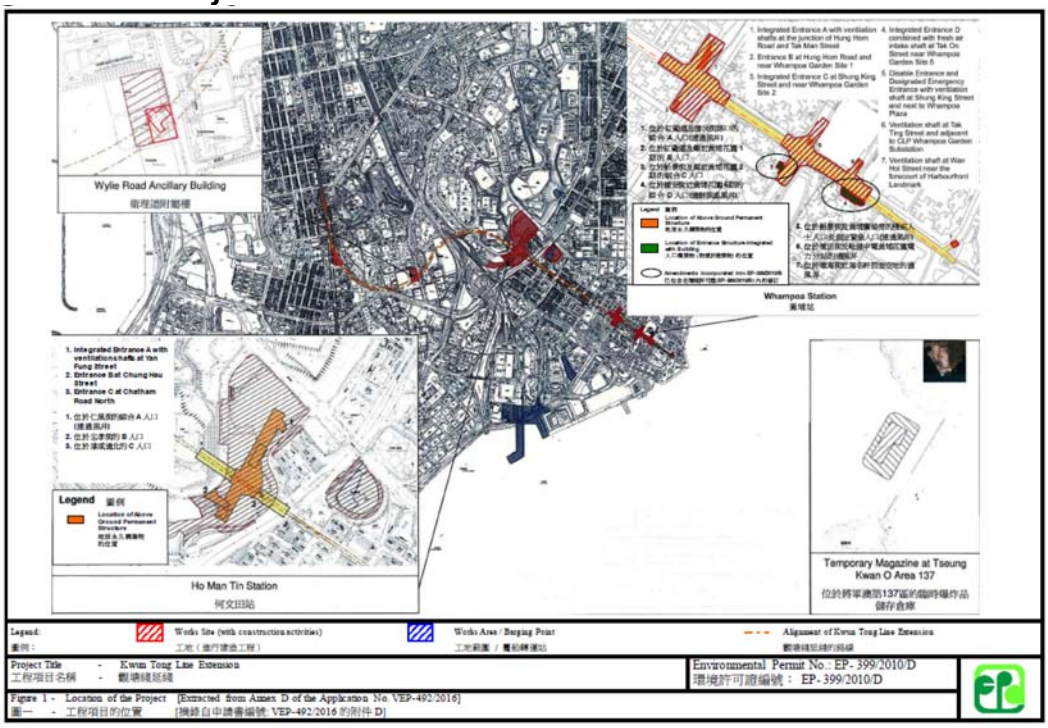


Figure 2. Location of Dust Monitoring Stations (CD1 / CD1a)

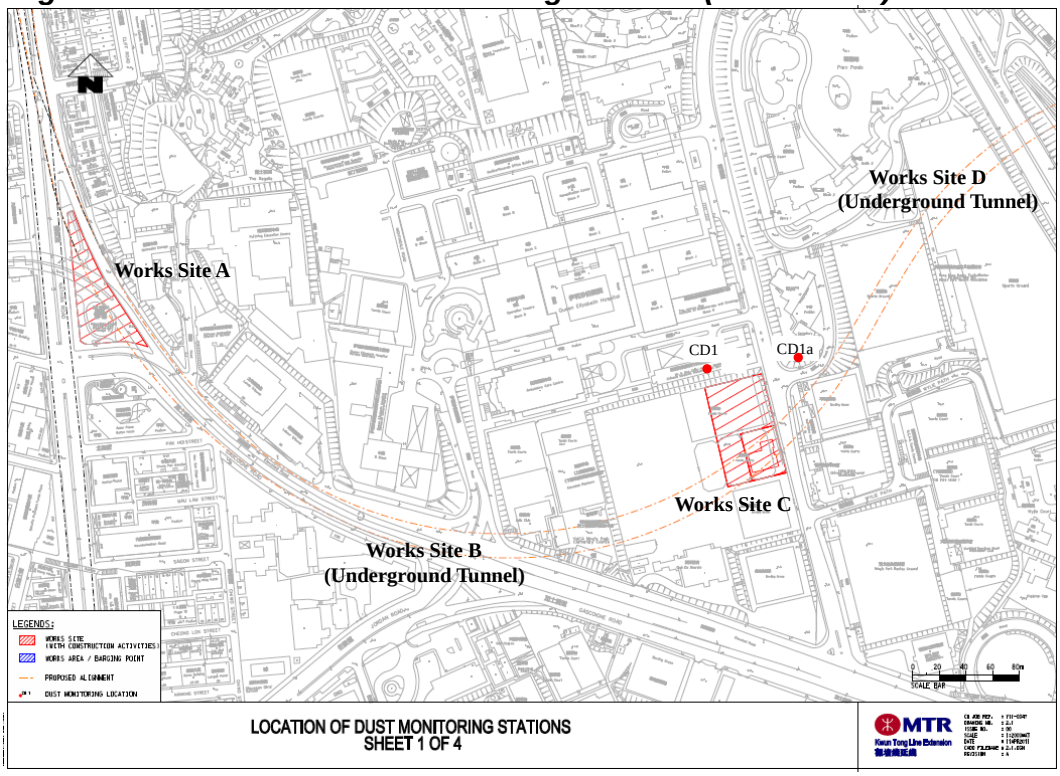


Figure 3. Location of Dust Monitoring Stations (CD2 / CD2a and CD3a)

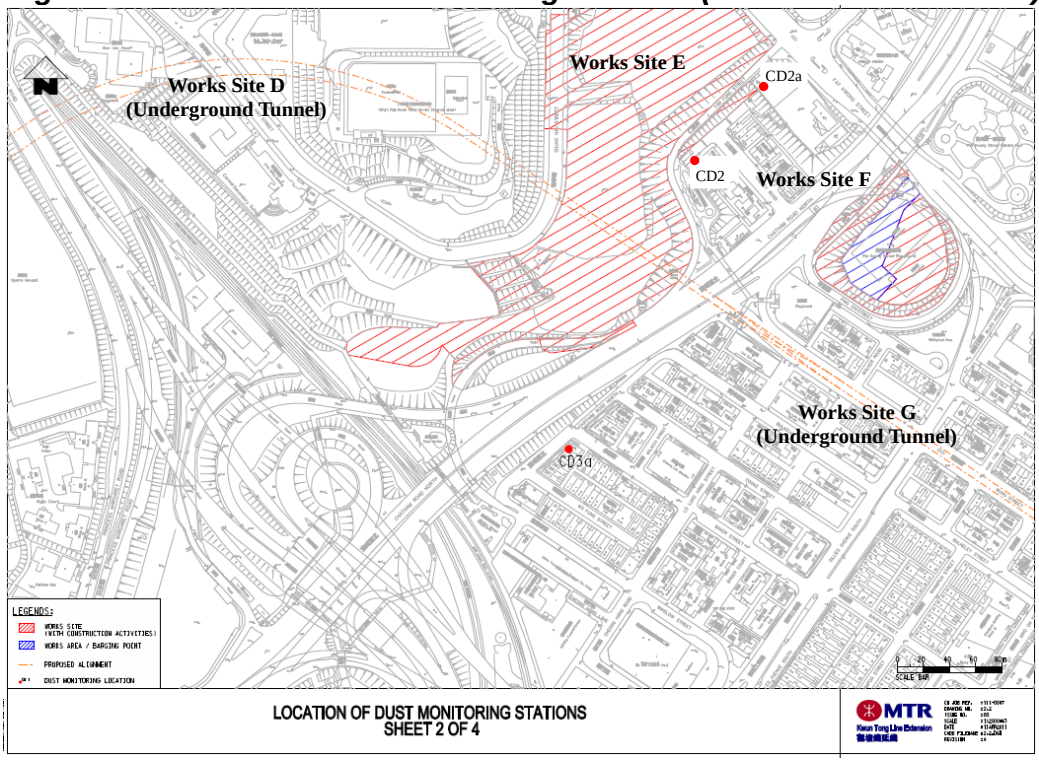


Figure 5. Location of Dust Monitoring Stations (CD6a)

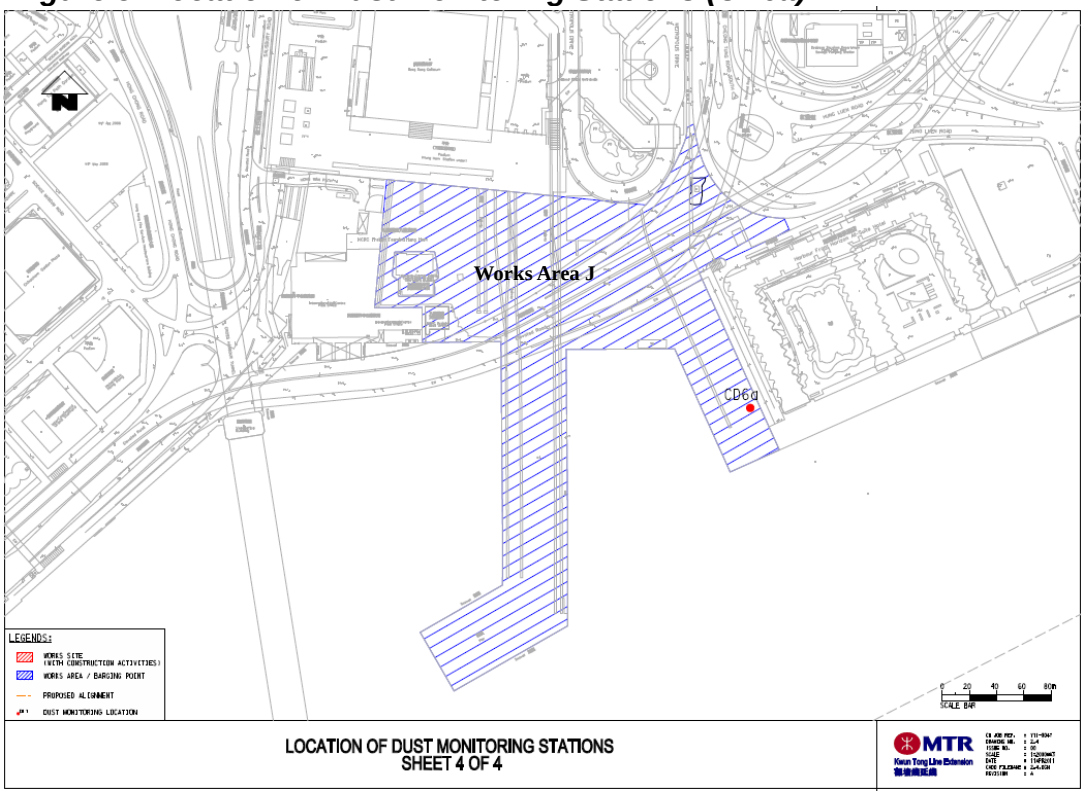


Figure 6. Location of Noise Monitoring Stations (CN1, CN2 and CN3 / CN3a)

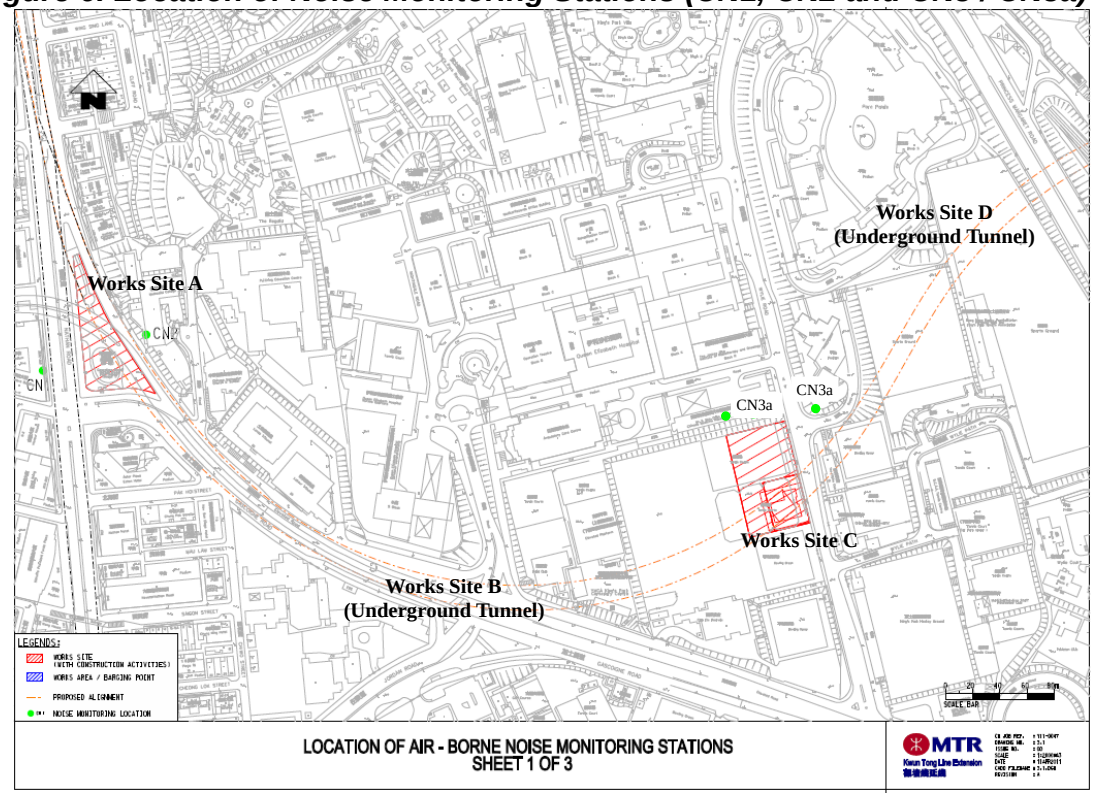


Figure 7. Location of Noise Monitoring Stations (CN4 / CN4a and CN6)

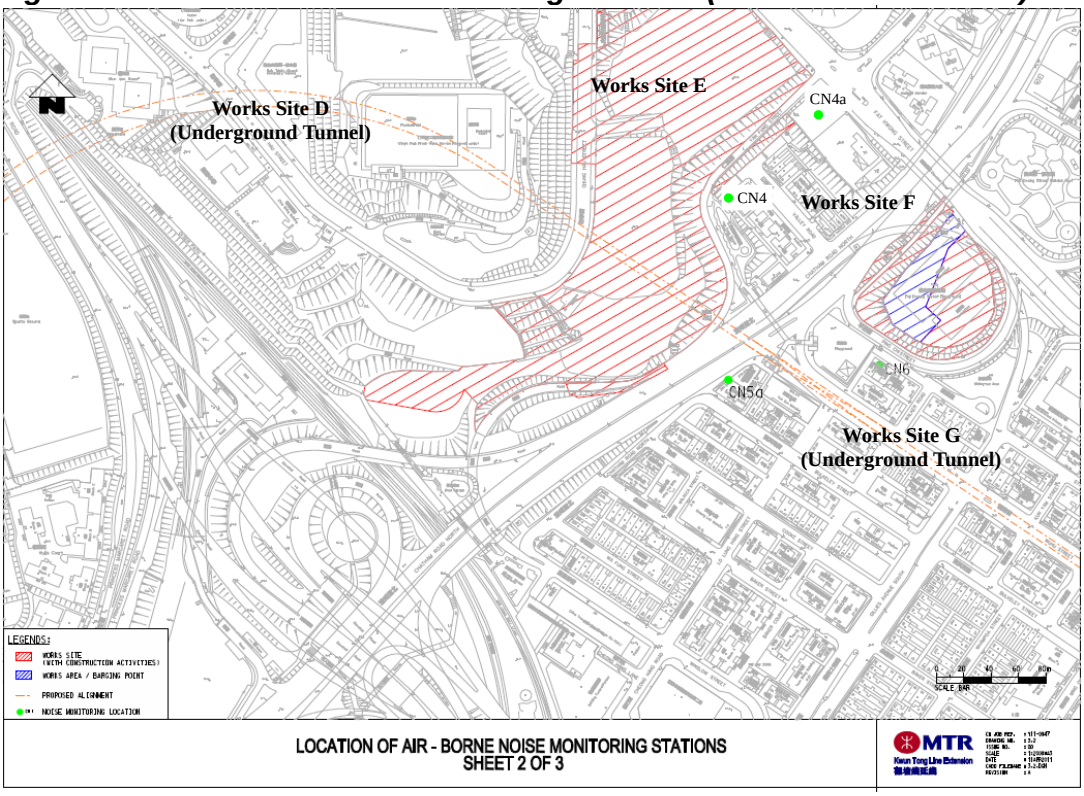
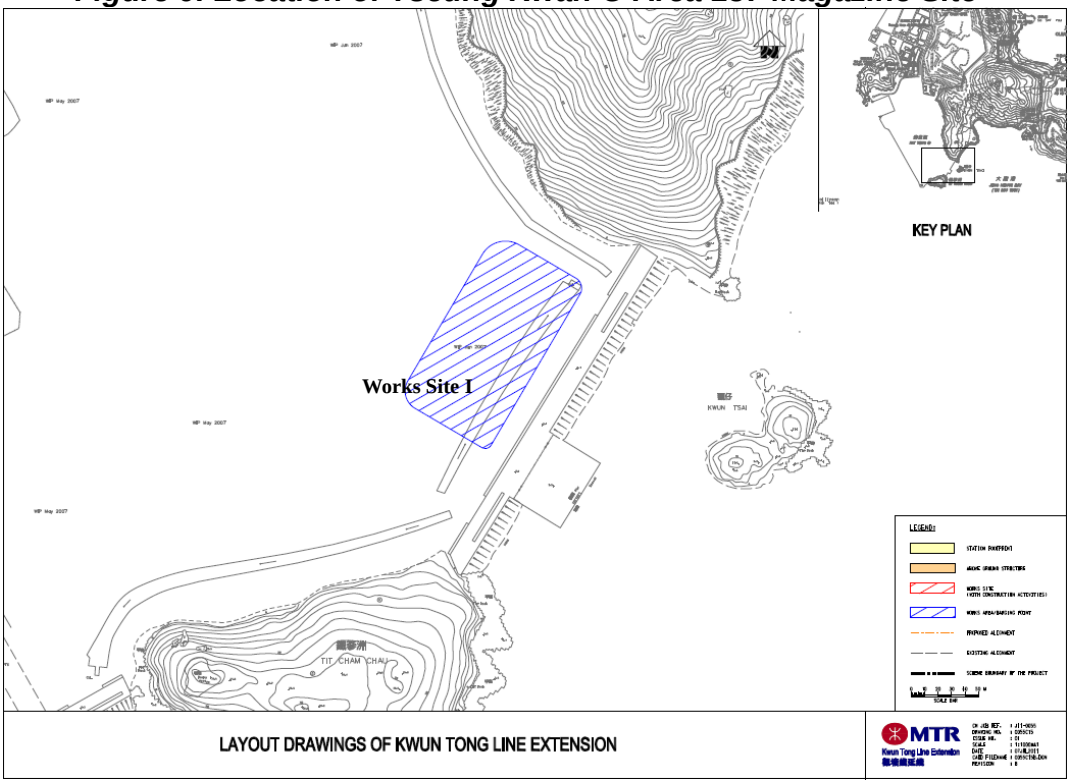


Figure 9. Location of Tseung Kwan O Area 137 Magazine Site



Appendix B

Environmental Quality Performance Limits

Action and Limit Levels for 24-hour TSP

Monitoring Station	Action Level (μg/m3)	Limit Level (μg/m3)
CD1 / CD 1a	171	260
CD2 / CD 2a	183	260
CD3a	192	260
CD4a	187	260
CD5	168	260
CD6a	182	260

Action and Limit Levels for 1-hour TSP for Complaint Handling

Monitoring Station	Action Level (μg/m3)	Limit Level (μg/m3)
CD1 / CD1a	310	500
CD2 / CD 2a	301	500
CD3a	311	500
CD4a	303	500
CD5	309	500
CD6a	316	500

Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level (dB(A)), Leq(30min)
0700-1900 hr on normal weekdays	When one documented complaint is received	75*

* Limit for school is 70 dB(A) and 65 dB(A) during school examination periods.

Appendix C

Event Action Plans

Table 4.4: Event and Action Plan for Construction Dust Monitoring

EVENT	ACTION			
	ET[1]	IEC[1]	ER[1]	Contractor
Action Level				
1. Exceedance for one sample	1. Identify sources, investigate the causes of complaint and propose remedial measures. 2. Inform IEC and ER. 3. Repeat measurement to confirm finding;. 4. Increase monitoring frequency.	1. Check monitoring data submitted by the ET. 2. Check the Contractor's working methods.	1. Notify the Contractor.	1. Rectify any unacceptable practices. 2. Amend working methods agreed with the ER as appropriate.
2. Exceedance for two or more consecutive samples	1. Identify sources. 2. Inform the IEC and ER. 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings. 5. Increase monitoring frequency to daily. 6. Discuss with the IEC, ER and Contractor on remedial action required. 7. If exceedance continues, arrange meeting with the IEC, Contractor and ER. 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by the ET. 2. Check the Contractor's working methods. 3. Discuss with the ET, ER and Contractor on possible remedial measures if required. 4. Advise the ER on the effectiveness of proposed remedial measures if required.	1. Notify the Contractor. 2. Ensure remedial measures properly implemented.	1. Submit proposals for remedial action to the ER within 3 working days of notification. 2. Implement the agreed proposals. 3. Amend proposal as appropriate.

EVENT	ACTION			
	ET[1]	IEC[1]	ER[1]	Contractor
Limit Level				
1. Exceedance for one sample	1. Identify sources, investigate causes of exceedance and proposed remedial measures. 2. Inform the IEC, ER, and Contractor. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 5. Assess effectiveness of the Contractor's remedial action and keep the IEC and ER informed of the results.	1. Check monitoring data submitted by the ET. 2. Check the Contractor's working methods. 3. Discuss with the ET, ER and Contractor on possible remedial measures. 4. Advise the ER and ET on the effectiveness of the proposed remedial measures. 5. Supervise the implementation of remedial measures.	1. Confirm receipt of the notification of exceedance in writing. 2. Notify the Contractor. 3. Ensure remedial measures are properly implemented.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial action to the ER and copy to the ET and IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal as appropriate.

Table 5.3: Event and Action Plan for Construction Noise Monitoring

EVENT	ACTION			
	ET[1]	IEC[1]	ER[1]	Contractor
Action Level	1. Notify the IEC, ER and Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IEC and Contractor. 4. Discuss jointly with the ER and Contractor and formulate remedial measures. 5. Increase the monitoring frequency to check the mitigation effectiveness.	1. Review the monitoring data submitted by the ET. 2. Review the construction methods and proposed redial measures by the Contractor, and advise the ET and ER if the proposed remedial measures would be sufficient.	1. Notify the Contractor. 2. Require the Contractor to propose remedial measures for implementation if required.	1. Submit noise mitigation proposals to the ER and copy to the IEC and ET. 2. Implement noise mitigation proposals.
Limit Level	1. Notify the IEC, ER and Contractor. 2. Identify sources. 3. Repeat measurements to confirm findings. 4. Carry out analysis of the Contractor's working procedures with the ER and Contractor to determine possible mitigations to be implemented. 5. Record the causes and action taken for the exceedances. 6. Increase the monitoring frequency. 7. Assess the effectiveness of the Contractor's remedial action with the ER and keep the IEC informed of the results. 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst the ER, ET and Contractor on the potential remedial action. 2. Review the Contractor's remedial action whenever necessary to assure their effectiveness and advise the ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problems. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what portion of work is responsible and instruct the Contractor to stop that portion of works until the exceedance is abated.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial action to the ER and copy to the ET and IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problems still not under control. 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Note (1): ET – Environmental Team, IEC – Independent Environmental Checker, ER – Engineer's Representative

Table 3.2: Event / Action Plan for Construction/Operational Phase

Action Level	ET	IEC	ER	Contractor
Non-conformity on one occasion	1. Identify Source 2. Inform the IEC and the ER 3. Discuss remedial actions with the IEC, the ER and the Contractor 4. Monitor remedial actions until rectification has been completed	1. Check report 2. Check the Contractor's working method 3. Discuss with the ET and the Contractor on possible remedial measures 4. Advise the ER on effectiveness of proposed remedial measures. 5. Check implementation of remedial measures.	1. Notify Contractor 2. Ensure remedial measures are properly implemented	1. Amend working methods 2. Rectify damage and undertake any necessary replacement
Repeated Non-conformity	1. Identify Source 2. Inform the IEC and the ER 3. Increase monitoring frequency 4. Discuss remedial actions with the IEC, the ER and the Contractor 5. Monitor remedial actions until rectification has been completed 6. If exceedance stops, cease additional monitoring	1. Check monitoring report 2. Check the Contractor's working method 3. Discuss with the ET and the Contractor on possible remedial measures 4. Advise the ER on effectiveness of proposed remedial measures 5. Supervise implementation of remedial measures.	1. Notify the Contractor 2. Ensure remedial measures are properly implemented	1. Amend working methods 2. Rectify damage and undertake any necessary replacement

Note:
ET – Environmental Team
IEC – Independent Environmental Checker
ER – Engineer's Representative

Appendix D

Implementation Schedule

Appendix 1.1 Implementation Schedule for Environmental Mitigation Measures

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
Miscellaneous											
3.4.2.1		WSD Fresh Water Service Reservoir Undertake an independent study of the effects of the drill and blast tunnelling on the reservoir to the satisfaction of WSD.	Ensure stability of the reservoir during construction	WSD Fresh Water Service Reservoir	MTR Corporation/ Main Contractor	-		✓		n/a	Implemented
Landscape and Visual											
5.12.1.2		Reuse of Existing Topsoil Existing topsoil shall be re-used for new planting areas within the project. The Contractor's construction plan shall consider using the soil removed for backfilling. Suitable storage ground, gathering ground and mixing ground shall be set up if necessary.	Conservation of valuable natural landscape resources	Gascoigne Road Rest Garden, Hill slopes above Chatham Road North, Roadside planters at Hung Hom Road	MTR Corporation/ Main Contractor	EIA recommendation		✓		MTR Corporation / LandsD, LCSD / HyD	Implemented
5.12.1.2		Tree Transplantation Transplantation is proposed for a number of trees which are generally able to provide high amenity value and are likely to survive the transplantation process.	Conservation of valuable natural landscape resources	Gascoigne Road Rest Garden, HOM Station, Yan Fung Street Rest Garden Slopes surrounding Fat Kwong Street Playground, WHA Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	All transplantation will be carried out in accordance with ETWB TCW No. 3/2006.	✓	✓		MTR Corporation / LandsD / HyD / LCSD / AFCD	Implemented
5.12.1.2		Erection of Decorative Hoardings Temporary decorative screen hoardings shall be designed and erected to be compatible with the existing urban context, either brightly and imaginatively or with visually unobtrusive design and colours where more appropriate. All works sites and works areas shall be surrounded by such hoardings, which shall be removed at project completion.	Visual screening of works site during construction	All works sites and Temporary Works Areas	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓		Contractor	Implemented
5.12.1.2		Control of night-time lighting glare All security floodlights for construction sites and temporary works areas shall be equipped with adjustable shield, frosted diffusers and reflective covers, and be carefully controlled	Restricting light pollution to nearby receivers	All works sites and Temporary Works Areas	Main Contractor	EIA recommendation		✓		Contractor	Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		to minimize light pollution and night-time glare to nearby receivers.									
5.12.1.2		Re-provision of Public Open Spaces Every effort should be made to minimise use of public open spaces, however if affected by the Project they shall be re-provisioned to an equal or improved standard at completion of the project. Sensitive design and reinstatement of the affected Public Open Spaces (Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Playground) shall be made, incorporating replacement facilities to those currently provided and using materials of quality suitable for long term use and acceptable to the relevant government departments including LCSD and PlanD, who shall be consulted on the design of the reinstated public open spaces at an early stage of the design process.	Replacement of loss of resources	Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Playground,	MTR Corporation / Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	LCSD	Implemented
5.12.1.2		Compensatory Tree Planting Suitable land pockets within the project area will be used for the implementation of compensatory mitigation to offset the net loss of key landscape resources and improve visual amenity. A compensatory tree planting proposal including locations of tree compensation will be submitted separately to seek relevant government department's approval, in accordance with ETWB TCW No. 3/2006.	Replacement of loss of resources and Enhancement of visual amenity	Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Playground, WAB, HOM Station WHA Station	MTR Corporation / Main Contractor/ Detailed Design Consultant	ETWB TCW No. 3/2006. WBTC 7/2002	✓	✓	✓	MTR Corporation / LandsD/ HyD/ LCSD/ AFCD	Implemented / To be implemented
5.12.1.2		Horizontal and Slope Greening Shotcreting of cut rock slopes shall be avoided and greening applications employed throughout the project. At HOM Station the backfill slopes shall be hydroseeded and native seedling trees planted. The station roof shall be temporarily greened should there be no further on-site development within 1 year of completion of	Mitigation of loss of resources and Enhancement of visual amenity	Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Playground, WAB, HOM Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	WBTC 25/93 WBTC 17/2000	✓	✓	✓	MTR Corporation / LandsD	Implemented / To be implemented

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		KTE, until permanent measures are undertaken under the proposed property development stage. Parapets at WAB and HOM Station shall be provided with internal permanent planter boxes. The roof at WAB shall be greened to improve visual amelioration from surrounding high level viewers Station entrances at HOM and WHA shall utilise shrub planting areas to provide localised greening		WHA Station							
5.12.1.2		<u>Planting</u> Vertical greening / climbers shall be applied to all above ground structures against exposed walls where appropriate. Further such localised planting systems shall be instigated subject to technical operational and maintenance constraints.	Mitigation of loss of resources and Enhancement of visual amenity	WAB, HOM Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	MTR Corporation	Implemented / To be implemented
5.12.1.2		<u>Architectural Design Aesthetics for the WAB at Club de Recreio</u> The emergency access and ventilation building shall be designed in a way so as to ensure the form, material and surface detailing of this structure can fit sympathetically into the local context. The form shall consider the Cultural Heritage of the Club de Recreio site as well as other proximate buildings. The structure shall incorporate vertical greening / climbers.	Enhancement of visual amenity	WAB	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	MTR Corporation	Implemented
5.12.1.2		<u>Architectural Design Aesthetics for Above-Ground Structures at HOM Station</u> All station entrances, vent shafts, chillers and other above-ground structures shall be designed in accordance with the standardised MTR Corporation architectural theme for the KTE and other current rail projects. However specific attention shall be undertaken to ensure the form, material and surface detailing of these structures is considered to	Enhancement of visual amenity	HOM Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	MTR Corporation	Implemented

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		fit into the local context in terms of the architectural character of the site.									
5.12.1.2		Architectural Design Aesthetics for Above-Ground Structures at WHA Station These shall be designed in accordance with the standardised MTR Corporation architectural theme for the KTE and other current rail projects. However specific attention shall be undertaken to ensure the form, material and surface detailing of these structures is considered to fit into the local context in terms of the architectural character of the site.	Enhancement of visual amenity	WHA Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	MTR Corporation	Implemented
Air Quality											
S.6.7.1.7 & S.6.9.2.3		Cut-and-Cover areas in the vicinity of adits and shafts (if applicable):- ▪ Heavy construction activities and wind erosion at the cut-and-cover areas, active areas for heavy construction activities: - Watering every hour at exposed soil. ▪ Trucks for transportation of materials: - Wheel washing facilities should be provided at all site exits. Vehicles should be washed before leaving works sites. Spoil on trucks should be well covered before leaving works sites to minimise the generation of dusty materials. - Haul roads within works sites should be paved and water spraying would be provided to keep the wet condition.	To minimise dust impacts	All relevant works sites	MTR Corporation/ Main Contractor/ Detailed Design Consultant	Air Pollution Control Ordinance	✓	✓			Implemented
S.6.7.1.7 & S.6.9.2.3		Barging point at Hung Hom Finger Pier: ▪ For haul roads within the area of barging point for transportation of spoil, all road surfaces should be paved and hourly water spraying should be provided to keep the wet condition as far as practical. ▪ The spoil unloading process should be	To minimise dust impacts	Barging Point at Hung Hom Finger Pier	MTR Corporation/ Main Contractor/Detailed Design Consultant	Air Pollution Control Ordinance	✓	✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		undertaken within an enclosed tipping hall. Water spraying and 3-sided screen with top should be provided at the discharge point for dust suppression. ▪ Vehicle wheel washing facilities should be provided at the exits of the barging point.									
S.6.7.1.5 & S. 6.7.1.8		Rock crushing equipment at HOM Station and barging point at Hung Hom Finger Pier if operated during construction: ▪ A dust enclosure with fabric baghouse/cartridge filter type dust extraction and collection system or equivalent system with 99% or more dust removal efficiency for the rock crushing equipment, haul road and unloading location; and ▪ Watering of paved roads within the area of the rock crushing facility as good site practice.	To minimise dust impacts	Rock crushing equipment at HOM Station and Barging Point at Hung Hom Finger Pier	MTR Corporation/ Main Contractor/Detailed Design Consultant	Air Pollution Control Ordinance	✓	✓			Implemented
S.6.7.1.5 & S.6.9.2.2		Tarpaulin covers would be provided on wire mesh covered steel cages to prevent dust emission during open blasting at HOM Station;	To minimise dust impacts	Open blasting area at HOM Station	MTR Corporation/ Main Contractor/Detailed Design Consultant	EIA recommendation	✓	✓			Implemented
S.6.9.2.4		Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices: ▪ Use of regular watering, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather. ▪ Use of frequent watering for particularly dusty construction areas and areas close to ASRs. ▪ Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not	To minimise dust impacts	All works sites	MTR Corporation/Main Contractor /Detailed Design Consultant	Air Pollution Control Ordinance	✓	✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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		practicable owing to frequent usage, watering should be applied to aggregate fines. ▪ Open temporary stockpiles should be avoided or covered. Prevent placing dusty material storage piles near ASRs. ▪ Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations. ▪ Establishment and use of vehicle wheel and body washing facilities at the exit points of the site. ▪ Imposition of speed controls for vehicles on unpaved site roads. 8km per hour is the recommended limit. ▪ Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs. ▪ Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides. ▪ Loading, unloading, transfer, handling or storage of large amount of cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system. ▪ Covering or enclosing any conveyor belt systems will generally be fully enclosed, depending on the design, materials chosen, and dimension of the conveyor system.									
Air-borne Noise											
S.7.9.2.6		The following good site practices should be implemented: ▪ Only well-maintained plant should be operated on-site and plants should be serviced regularly during the construction period; ▪ Mobile plant, if any, should be sited as	To minimise air-borne noise impacts	All works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented

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		far from NSRs as possible; ▪ Plant known to emit noise strongly in one direction should, wherever possible, be properly orientated so that the noise is directed away from the nearby NSRs; ▪ Use of site hoarding as a noise barrier to screen noise at low level NSRs; ▪ Machines and plant that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum; and ▪ Any material stockpiles and other structures should be effectively utilised, wherever practicable, to screen the noise from on-site construction activities.									
S.7.9.2.1		The following quiet PME should be used: ▪ Air compressor ▪ Asphalt Paver ▪ Breaker ▪ Bulldozer ▪ Concrete lorry mixer ▪ Concrete Pump / Grout Pump ▪ Crane ▪ Cutter, circular, steel (electric) ▪ Dump Truck ▪ Backhoe ▪ Generator ▪ Vibrating Poker, hand-held (electric) ▪ Rock Drill ▪ Roller, vibratory ▪ Scraper ▪ Water pump (electric)	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
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S.7.9.2.4		Movable or fixed noise barrier should be used for the following PME where practicable: ▪ Wheeled Excavator/Loader ▪ Crane ▪ Hydraulic Breaker ▪ Scraper ▪ Breaker, hand-held ▪ Compactor, vibratory ▪ Drill, percussive, hand-held (electric) ▪ Concrete pump ▪ Circular Saw, bench mounted ▪ Truck ▪ Bar bender and cutter (electric) ▪ Conveyor belt ▪ Generator, Super Silenced ▪ Grout Pump ▪ Saw, wire ▪ Water Pump, Submersible (Electric) ▪ Hydraulic Jack with Pump	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented
S.7.9.2.4		Acoustic fabric should be used for the following PME where practicable: ▪ Compressor and Pneumatic Drilling Rig ▪ Piling, vibrating hammer ▪ Rock Drill ▪ Silent Piling System	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented
S.7.9.2.4		Noise enclosure/acoustic shed should be used for the following PME where practicable and will generally be fully enclosed depending on the design, materials chosen, and dimension of the PME: ▪ Air Compressor ▪ Rock Crushing Equipment	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented
S.7.9.2.4		Silencer should be used for the ventilation fans.	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented
S.7.9.2.6		Use of temporary hoardings along the works boundary.	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented

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S.7.9.2.2		Noise enclosures should be installed for the muckout points in WS1 (Gascoigne Road Rest Garden), WS7a1 (WAB at Club de Recreio) and WS26a (Fat Kwong Street Playground)	To comply with the criteria of Noise Control Ordinance.	All muckout points at WS1, WS7a1 and WS26a	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			Implemented
S.7.9.2.3		Noise enclosures should be installed for all rock crushing equipment.	To comply with the criteria of Noise Control Ordinance.	All rock crushing equipment	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓			No rock crushing equipment
S.7.10.1.2		The maximum permissible sound power levels (max SWLs) for the fixed plant should be complied with during the selection of equipment and mitigation measures.	To comply with the criteria of Noise Control Ordinance.	All relevant location of fixed plant	MTR Corporation/ Detailed Design Consultant	Noise Control Ordinance	✓		✓		Implemented
S.7.10.2.1		The detailed design for all fixed plant should incorporate the following good practice where practicable: ▪ Louvers should be orientated away from adjacent NSRs whenever practicable; ▪ Adequate direct noise mitigation measures including silencers, acoustic louvers or acoustic enclosures should be adopted where necessary; and ▪ Quieter plant should be chosen as far as practical.	To comply with the criteria of Noise Control Ordinance.	At outlets of fixed plant including ventilation building, ventilation shafts, plant room for chiller plant and cooling towers, etc	MTR Corporation/ Detailed Design Consultant	Noise Control Ordinance	✓		✓		Implemented
Ground-borne Noise											
S.8.7.1.2		MTR will further review the proposed mitigation measures for operational ground-borne noise during the construction stage after the tunnel boring.	To comply with the criteria of Noise Control Ordinance.	At suitable location	MTR Corporation/ Main Contractor	-	✓				Implemented
S.8.7.1.3		Commissioning test is recommended to ensure compliance of the operational ground-borne noise levels	To comply with the criteria of Noise Control Ordinance.	Designated locations	MTR Corporation/ Main Contractor	Noise Control Ordinance	✓	✓	✓		Implemented
Water Quality											
S.9.7.6		Construction site run-off and general construction activities: ▪ The mitigation measures as outlined in the ProPECC PN 1/94 Construction Site Drainage should be adopted where applicable.	To control water quality impact from construction site runoff and general construction activities	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance, TM-DSS		✓			Implemented

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S.9.7.6		In case seepage of uncontaminated groundwater occurs, groundwater should be pumped out from the works areas and discharged into the storm system via silt removal facilities. Uncontaminated groundwater from dewatering process should also be discharged into the storm system via silt traps.	To control water quality impact from groundwater	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance		✓			Implemented
S.9.7.6		At the barging point, mitigation measures for control of water quality impact from surface run-off should be applied and the following good site practices should also be adopted: ▪ All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash. ▪ All hopper barges should be fitted with tight fitting seals to their bottom openings to prevent leakage of material. ▪ Construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site. ▪ Loading of barges and hoppers should be controlled to prevent splashing of material into the surrounding water. Barges or hoppers should not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation.	To control water quality impact from barging point	Barging point	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance		✓			Implemented
S.9.7.6		For effluent discharge, there is a need to apply to EPD for a discharge licence for discharge of effluent from the construction site under the WPCO. The discharge quality should meet the requirements specified in the discharge licence. Minimum distances of 100m should be maintained between the discharge points of construction site effluent and the existing seawater intakes. If monitoring of the treated effluent quality	To control water quality impact from effluent discharge from construction site	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance		✓			Implemented

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		from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the WPCO license which is under the ambit of Regional Office of the EPD.									
S.9.7.6		To prevent the accidental spillage of chemicals, the Contractor should register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.	To control water quality impact from accidental chemical spillage	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance, Waste Disposal Ordinance		✓			Implemented
S.9.7.6		Any service shop and maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges.	To control water quality impact from accidental chemical spillage	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance, Waste Disposal Ordinance		✓			Implemented
S.9.7.6		Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows: ▪ Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. ▪ Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents. ▪ Storage area should be selected at a safe location on site and adequate space	To control water quality impact from accidental chemical spillage	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance, Waste Disposal Ordinance		✓			Implemented

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		should be allocated to the storage area.									
S.9.7.6		Regarding the hydrogeological impacts in the construction of cut-and-cover tunnels and associated excavations for the WAB / ventilation building, the following measures should be in place in order to mitigate any drawdown effects to the groundwater table during the operation of the temporary dewatering works: ▪ Toe grouting should be applied beneath the toe level of the temporary/permanent cofferdam walls as necessary to lengthen the effective flow path of groundwater from outside and thus control the amount of water inflow to the excavation. ▪ Recharge wells should be installed as necessary outside the excavation areas. Water pumped from the excavation areas should be recharged back into the ground.	To control groundwater hydrogeological impact and groundwater drawdown	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance		✓			Implemented
S.9.8.6		Measures for the tunnel run-off and drainage include: ▪ Track drainage channels discharge should pass through oil/grit interceptors/chambers to remove oil, grease and sediment before being pumped to the foul sewer/holding tank for further disposal. ▪ The silt traps and oil interceptors should be cleaned and maintained regularly. ▪ Oily contents of the oil interceptors should be transferred to an appropriate disposal facility, or to be collected for reuse, if possible.	To control runoff from rail track	Tunnels and rail tracks	MTR Corporation/ Detailed Design Consultant	Water Pollution Control Ordinance	✓		✓		Implemented
S.9.8.6		Measures for the control of sewage effluents include: ▪ Connection of domestic sewage generated from the KTE project should be diverted to the foul sewer wherever possible. If public sewer system is not available, sewage tankering away	To control water quality impact from sewage effluent discharge from the ventilation building and Stations	Ventilation building and Stations	MTR Corporation/ Detailed Design Consultant	EIAO-TM, Water Pollution Control Ordinance, TM-DSS, ProPECC PN 5/93	✓		✓		Implemented

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		services or on-site sewage treatment facilities should be provided to prevent direct discharge of sewage to the nearby storm system and all the discharge should comply with the requirements stipulated in the TM-DSS. ▪ For handling, treatment and disposal of other operation stage effluent, the practices outlined in ProPECC PN 5/93 should be adopted where applicable.									
Waste Management Implications											
S.10.5.6.1		Recommendations for good site practices: ▪ Prepare a Waste Management Plan approved by the Engineer/Supervising Officer of the Project based on current practices on construction sites. ▪ Training of site personnel in, site cleanliness, proper waste management and chemical handling procedures. ▪ Provision of sufficient waste disposal points and regular collection of waste. ▪ Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers. ▪ Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors. ▪ Separation of chemical wastes for special handling and appropriate treatment.	To implement good site practice for handling, sorting reuse and recycling of C&D materials	All works sites	Main Contractor	Waste Disposal Ordinance, Land (Miscellaneous Provisions) Ordinance, ETWB TC(W) No 31/2004		✓			Implemented
S.10.5.6.1		Recommendations for waste reduction measures: ▪ Sorting of demolition debris and excavated materials from demolition works to recover reusable/ recyclable portions (i.e. soil, broken concrete, metal etc.). ▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper	To implement on-site sorting facilitating reuse and recycling of materials as well as proper disposal of waste	All works sites	Main Contractor	Waste Disposal Ordinance, Land (Miscellaneous Provisions) Ordinance		✓			Implemented

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		disposal. ▪ Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the workforce. ▪ Proper storage and site practices to minimize the potential for damage or contamination of construction materials. ▪ Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste. ▪ Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycle.									
S.10.5.6.1		The Contractor should prepare and implement a Waste Management Plan as a part of the Environmental Management Plan in accordance with ETWB TCW No 19/2005 which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the construction activities.	To keep trace of the generation, minimization, reuse and disposal of C&D materials in the Project	All works sites	Main Contractor	ETWB TCW No 19/2005		✓			Implemented
S.10.5.6.1		Storage of materials on-site may induce adverse environmental impacts if not properly managed, recommendations to minimise the impacts include: ▪ Waste, such as soil, should be handled and stored well to ensure secure containment, thus minimising the potential of pollution. ▪ Maintain and clean storage areas routinely. ▪ Stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away. ▪ Different locations should be designated to stockpile each material to enhance	To minimise potential impacts of waste storage and enhance reusable volume	All works sites	Main Contractor	-		✓			Implemented

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		reuse.									
S.10.5.6.1		Waste hauliers must hold a valid permit for the collection of waste as stipulated in their permits. Removal of waste should be done in a timely manner.	To collect and remove waste generated	All works sites	Main Contractor	-		✓			Implemented
S.10.5.6.1		Implementation of trip-ticket system to monitor waste disposal and control fly-tipping. ▪ Set up warning signs at vehicular access points reminding drivers of designated disposal sites and penalties of an offence. ▪ Installation of close-circuited television at access points of vehicles to monitor and prevent illegal dumping.	To monitor disposal of waste and control fly-tipping	All works sites	Main Contractor	ETWB TC(W) No 31/2004		✓			Implemented
S.10.5.6.1		Wheel washing facilities should be provided before the trucks leave the works area.	To minimise dust impact	All works sites	Main Contractor	-		✓			Implemented
S.10.5.6.1		The Contractor should ensure the on-site separation from inert portion. The waste delivered to landfill should not contain any free water or have water content more than 70% by weight. The haulier must ensure suitable amount of waste would be loaded on different types of trucks used. A one-week notice should be given to EPD with information on Contractor's name and respective contact details.	To meet the requirement for disposal at landfill	All works sites	Main Contractor	-		✓			Implemented
S.10.5.6.1		If chemical wastes are produced at the construction site, the Contractor would be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Containers used for storage of chemical waste should : ▪ Be compatible with the chemical wastes being stored, maintained in good condition and securely sealed. ▪ Have a capacity of less than 450 litres unless the specifications have been approved by EPD; and ▪ Display a label in English and Chinese	To properly store the chemical waste within works sites and works areas	All works sites	Main Contractor	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes		✓			Implemented

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		in accordance with instructions prescribed in Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation.									
S.10.5.6.1		The chemical storage areas should: ▪ Be clearly labelled to indicate corresponding chemical characteristics of the chemical waste and used for storage of chemical waste only. ▪ Be enclosed on at least 3 sides. ▪ Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest. ▪ Have adequate ventilation. ▪ Be covered to prevent rainfall from entering. ▪ Be properly arranged so that incompatible materials are adequately separated.	To prepare appropriate storage areas for chemical waste at works areas	All works sites	Main Contractor	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes		✓			Implemented
S.10.5.6.1		Lubricants, waste oils and other chemical wastes would be generated during the maintenance of vehicles and mechanical equipments. Used lubricants should be collected and stored in individual containers which are fully labelled in English and Chinese and stored in a designated secure place.	To clearly label the chemical waste at works areas	All works sites	Main Contractor	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes		✓			Implemented
S.10.5.6.1		A trip-ticket system should be operated in accordance with the Waste Disposal (Chemical Waste) (General) Regulation to monitor all movements of chemical waste. The Contractor should employ a licensed collector to transport and dispose of the chemical wastes, to either the approved CWTC at Tsing Yi, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	To monitor the generation, reuse and disposal of chemical waste	All works sites	Main Contractor	Waste Disposal (Chemical Waste) (General) Regulation		✓			Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
S.10.5.6.1		General refuse should be stored in enclosed bins or compaction units separate from C&D materials and chemical waste. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D materials and chemical wastes.	To properly store and separate from other C&D materials for subsequent collection and disposal	All works sites	Main Contractor	-		✓			Implemented
S.10.5.6.1		The recyclable component of general refuse, such as aluminium cans, paper and cleansed plastic containers should be separated from other waste. Provision and collection of recycling bins for different types of recyclable waste should be set up by the Contractor. The Contractor should also be responsible for arranging recycling companies to collect these materials.	To facilitate recycling of recyclable portions of refuse	All works sites	Main Contractor	-		✓			Implemented
S.10.5.6.1		The Contractor should carry out a training programme for workers in avoiding, reducing, reusing and recycling of materials generation. Posters and leaflets advising on the use of the bins should also be provided in the sites as reminders.	To raise workers' awareness on recycling issue	All works sites	Main Contractor	-		✓			Implemented
S.10.6.4		Chemical waste during the operation of the KTE project: ▪ The requirements stipulated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes should be followed in handling of chemical waste as in construction phase. ▪ A trip-ticket system should be operated in accordance with the Waste Disposal (Chemical Waste) (General) Regulation to monitor all movements of chemical wastes which would be collected by a licensed collector to a licensed facility for final treatment and disposal. ▪ The recommendations proposed for the mitigation of impacts from chemical waste in construction phase should also be followed.	To avoid environmental impacts in handling, storage and disposal of chemical waste	Ventilation building and Stations	MTR Corporation	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, Waste Disposal (Chemical Waste) (General) Regulation			✓		Implemented
S.10.6.4		General refuse during the operation of the	To separate the general refuse from other waste	Ventilation building and	MTR Corporation	-			✓		Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
		KTE project: ▪ Provide recycling bins at designated areas for proper recycling of papers, aluminium cans and plastics bottles. ▪ Separation from other waste types and collected by licensed collectors at daily basis to minimize the potential impacts from odour and vermin.	types and proper disposal of the refuse	Stations							
S.10.6.4		Industrial waste during the operation of the KTE project: ▪ Separation of reusable components like steel before collection by licensed collector	To recycle useful materials from industrial waste and proper disposal	Ventilation building and Stations	MTR Corporation	-			✓		Implemented
Hazard to Life											
S.12.12.1, S 12.12.6	Section 12.10.2.1, Section 12.10.2.4	Improved truck design to reduce the amount of combustibles in, front exhaust spark arrester, 1 x 9 kg water based and 1 x 9 kg dry chemical powder fire extinguishers. This should be combined with monthly vehicle inspection.	To meet the ALARP requirement.	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.1	Section 12.10.2.1	The explosive truck accident frequency should be minimized by implementing a dedicated training programme for both the driver and his attendants, including regular briefing sessions, implementation of a defensive driving attitude. In addition, drivers should be selected based on good safety record, and medical checks.	To meet the ALARP requirement.	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.1	Section 12.10.2.1	The contractor should as far as practicable combine the explosive deliveries for a given work area.	To meet the ALARP requirement.	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.1	Section 12.10.2.1	The explosive truck fire involvement frequency should be minimized by implementing a better emergency response and training to make sure the adequate fire extinguishers are used and attempt is made to evacuate the area of the incident or securing the explosive load if possible. All explosive vehicles should also be equipped with bigger	To meet the ALARP requirement.	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
		capacity AFFF-type extinguishers.									
S.12.12.1	Section 12.10.2.1	A minimum headway between two consecutive truck conveys of at least 10 min is recommended	To meet the ALARP requirement.	Along explosives transport routes	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.2	Section 12.10.2.2	Blasting activities including storage and transport of explosives should be supervised and audited by competent site staff to ensure strict compliance with the blasting permit conditions.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Works areas at which explosives would be stored and/or used.	MTR Corporation/ Main Contractor	Dangerous Goods Ordinance		✓		-	Implemented
S.12.12.1 & S.12.12.7.2	Section 12.10.2.1 & Section 12.10.2.5	Only the required quantity of explosives for a particular blast should be transported to avoid the return of unused explosives to the temporary magazine. The number of return trips to the temporary magazine with the full load of explosives or partial load should be minimised by proper co-ordination between blasting and delivery. If disposal is required for small quantities, disposal should be made in a controlled and safe manner by a Registered Shotfirer.	To reduce the risk during explosives transport.	Works areas at which explosives would be stored and/ or used.	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.5	Section 12.10.2.4	Use only experienced driver(s) with good safety record for explosive vehicle(s). Training should be provided to ensure it covers all major safety subjects.	To ensure safe transport of explosives.	At suitable location	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.5	Section 12.10.2.4	Develop procedure to ensure that parking space on the site is available for the explosives truck. Confirmation of parking space should be communicated to truck drivers before delivery.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.3	Section 12.10.2.3	Delivery vehicles shall not be permitted to remain unattended within the temporary magazine site (or appropriately wheel-locked).	To reduce the risk of fire within the magazine	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.3	Section 12.10.2.3	Good house-keeping within and outside of the temporary magazine to ensure that combustible materials (including vegetation)	To reduce the risk of fire within the magazine	Temporary explosives	MTR Corporation/ Main Contractor	-		✓		-	Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
		are removed and not allowed to accumulate.		magazine							
S.12.12.5	Section 12.10.2.4	Detonators shall not be transported in the same vehicle with other Class 1 explosives.	To reduce the risk of explosion during the transport of cartridged emulsion	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.2	Section 12.10.2.2	Emergency plan (i.e. temporary magazine operational manual) shall be developed to address uncontrolled fire in temporary magazine area. The case of fire near an explosive carrying truck in jammed traffic should also be covered. Drill of the emergency plan should be carried out at regular intervals.	To reduce the risk of fire.	Temporary explosives magazine and along explosives transport routes	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.2	Section 12.10.2.2	Adverse weather working guideline should be developed to clearly define procedure for transport explosives during thunderstorm.	To ensure safe transport of explosives.	Along explosives transport routes	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.2	Section 12.10.2.2	The magazine storage quantities need to be reported on a monthly basis to ensure that the two day storage capacity is not exceeded.	To reduce the risk within the magazine	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.5	Section 12.10.2.4	During transport of the explosives within the tunnel, hot work should not be permitted in the vicinity of the explosives offloading or charging activities.	To ensure safe transport of explosives.	Along explosives transport routes	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.5	Section 12.10.2.4	Ensure that UN 1.4B packaging of detonators remains intact until handed over at blasting site.	To reduce the risk of explosion during the transport of detonator.	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.6	Section 12.10.2.4	Steel vehicle tray welded to a steel vertical fire screen should be mounted at least 150 mm behind the drivers cab and 100 mm from the steel cargo compartment, the vertical screen shall protrude 150 mm in excess of all three (3) sides of the steel cargo compartment	To reduce the risk during explosives transport.	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.10	Section 12.10.2.5	Ensure cartridged emulsion with high water content should be preferred. Also, the emulsion with perchlorate formulation	To ensure safe explosives to be used.	-	MTR Corporation/ Main Contractor	-		✓		-	Implemented

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent	Implementation status
							D	C	O		
		should be avoided.									
S.12.12.3	Section 12.10.2.3	Traffic Management should be implemented within the temporary magazine site, to ensure that no more than 1 vehicle will be loaded at any time, in order to avoid accidents involving multiple vehicles within the site boundary. Based on the construction programme, considering that 6 trucks could be loaded over a peak 2 hour period, this is considered feasible.	To ensure that the risks from the proposed explosives storage and transport would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.3	Section 12.10.2.3	The design of the fill slope close to the temporary magazine site should consider potential washout failures and incorporate engineering measures to prevent a washout causing damage to the temporary magazine stores	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor,/Fill Bank Office	-		✓		-	Implemented
S.12.12.2	Section 12.10.2.2	The security plan should address different alert security level to reduce opportunity for arson / deliberate initiation of explosives. The corresponding security procedure should be implemented with respect to prevailing security alert status announced by the Government.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.3	Section 12.10.2.3	A suitable work control system should be introduced, such as an operational manual including Permit-to-Work system.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented
S.12.12.3	Section 12.10.2.3	The magazine building shall be regularly checked for water seepage through the roof, walls or floor.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-	Implemented

Note: D = Design
C = Construction
O = Operation

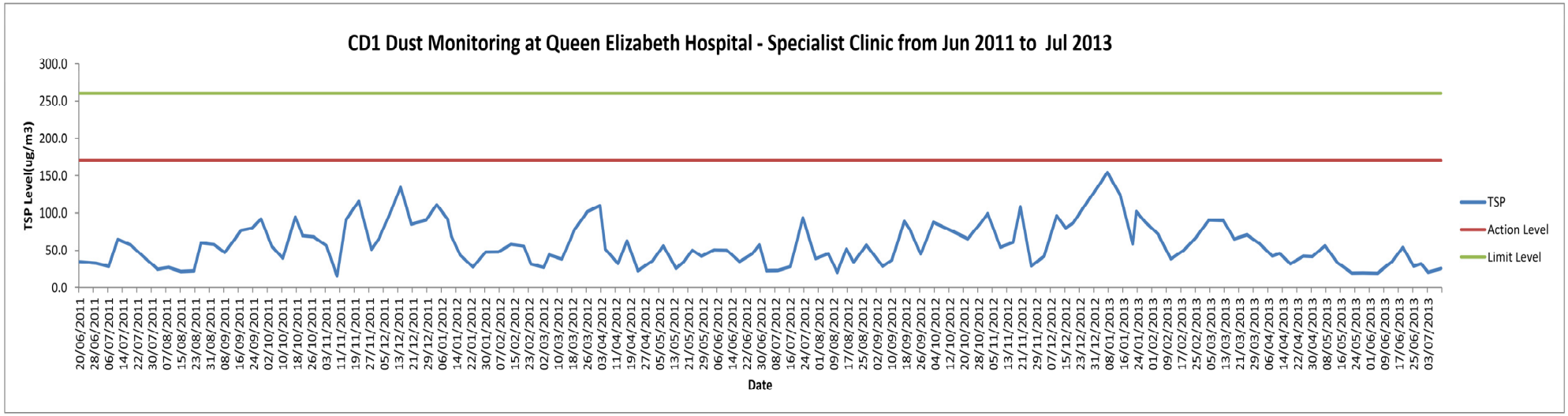
Appendix E

Impact Monitoring Graphical Plots (Air Quality Monitoring Results)

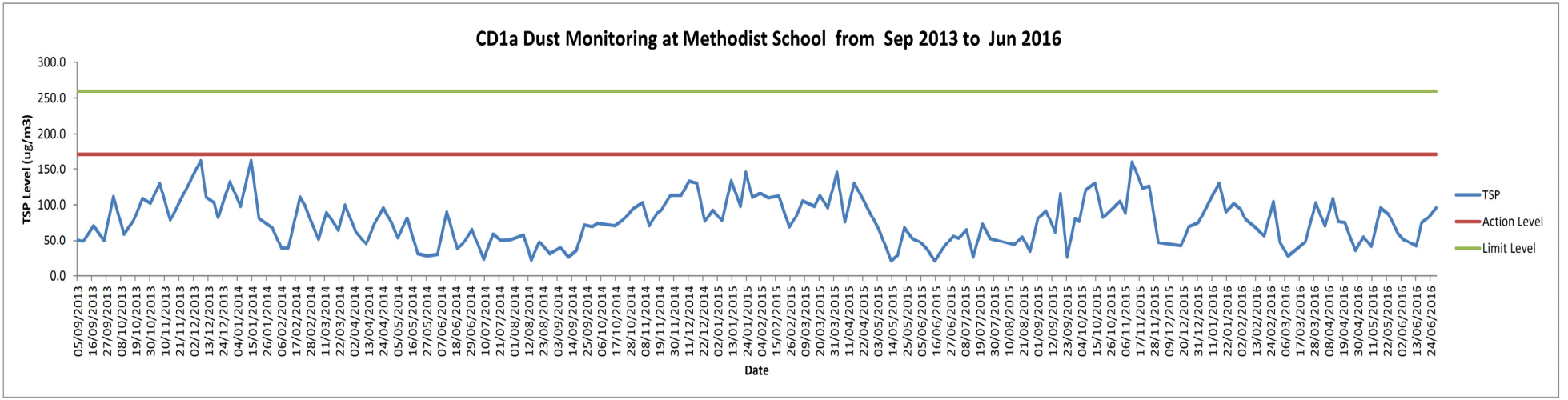
Major activities being carried out at respective construction areas:

Dust Monitoring Points	**Works Areas**		
CD1 - Queen Elizabeth Hospital – Specialist Clinic CD1a - Methodist School	**Wylie Road construction site**	Major Activities:	Period:
		1. Construction shaft excavation and mucking out for tunnel excavation	Aug 2011 to Mar 2015
		2. Ancillary building superstructure	Feb 2015 to Mar 2016
		3. Backfilling of shaft	Mar 2016 to Jun 2016
		4. Reinstatement of site	
CD2 - Yee Fu Building CD2a - PolyU Homantin Student Halls of Residence CD3a - No. 238 Chatham Road North	**Ho Man Tin Station works site**	Major Activities:	Period:
		1. Surface blasting and excavation	Jun 2011 to Mar 2014
		2. Slab and formation	Feb 2014 to May 2014
		3. Superstructure of HOM station	Apr 2014 to Jun 2015
		4. Building service and E&M works	Jun 2015 to Jun 2016
		5. Slope and backfilling	Jun 2016 to Oct 2016
		6. Landscaping works	
CD6a - Site boundary of Finger Pier adjacent to Harbourfront Horizon	**Finger Pier**	Major Activities:	Period:
		1. Construction of barging facilities	Jun 2011 to Mar 2012
		2. Regular maintenance works and materials stockpile	Mar 2012 to Dec 2013

CD1 - Queen Elizabeth Hospital – Specialist Clinic

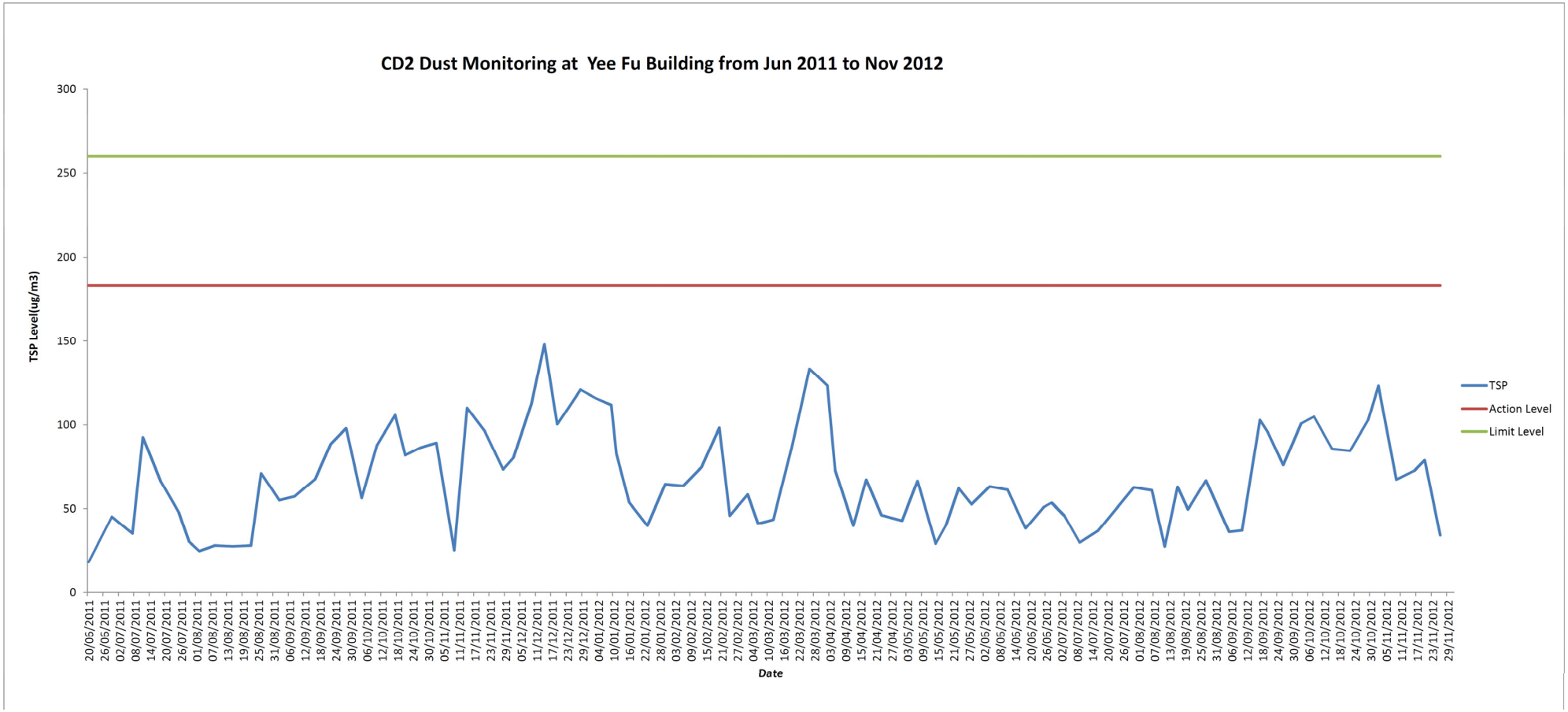


CD1a - Methodist School

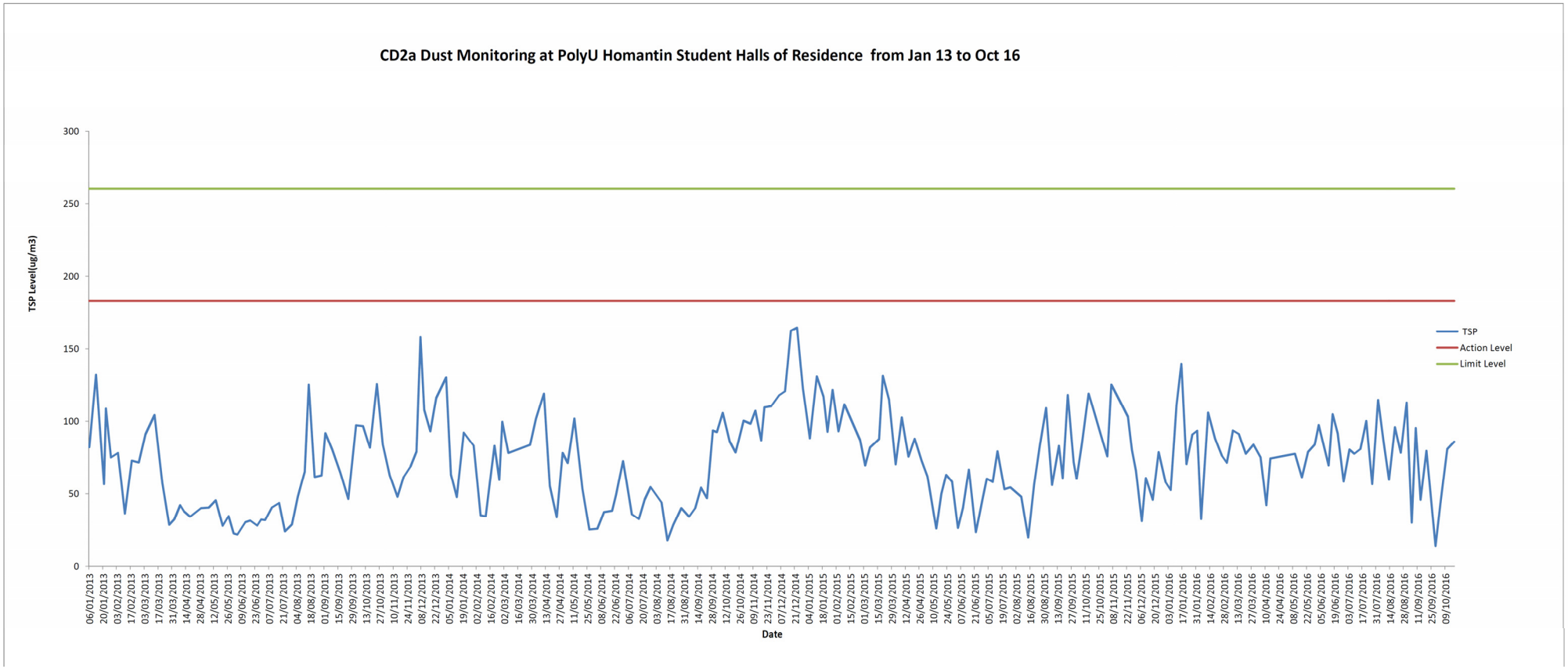


Remarks: Due to the access to QE Specialist Clinic has been denied and the alternative proposal was being reviewed, the measurement has been suspended for the period of August 2013.

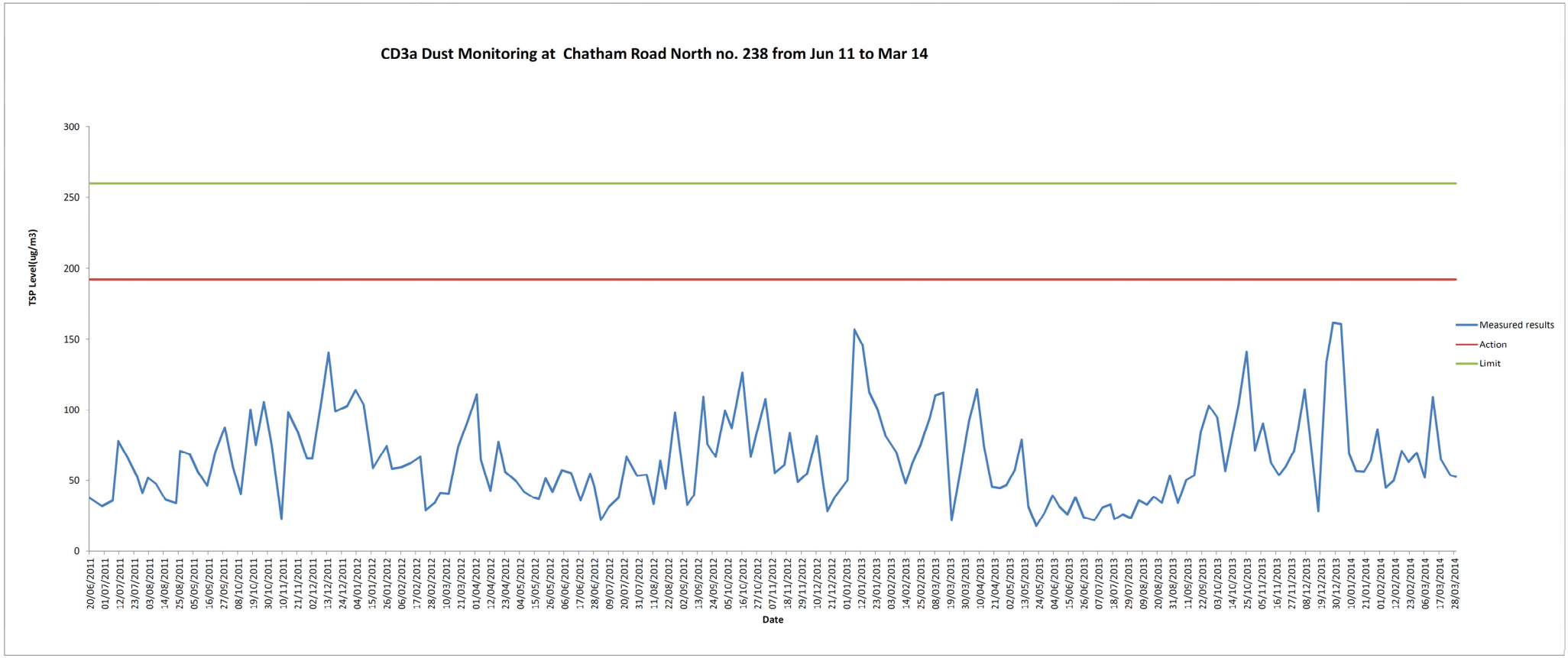
CD2 - Yee Fu Building

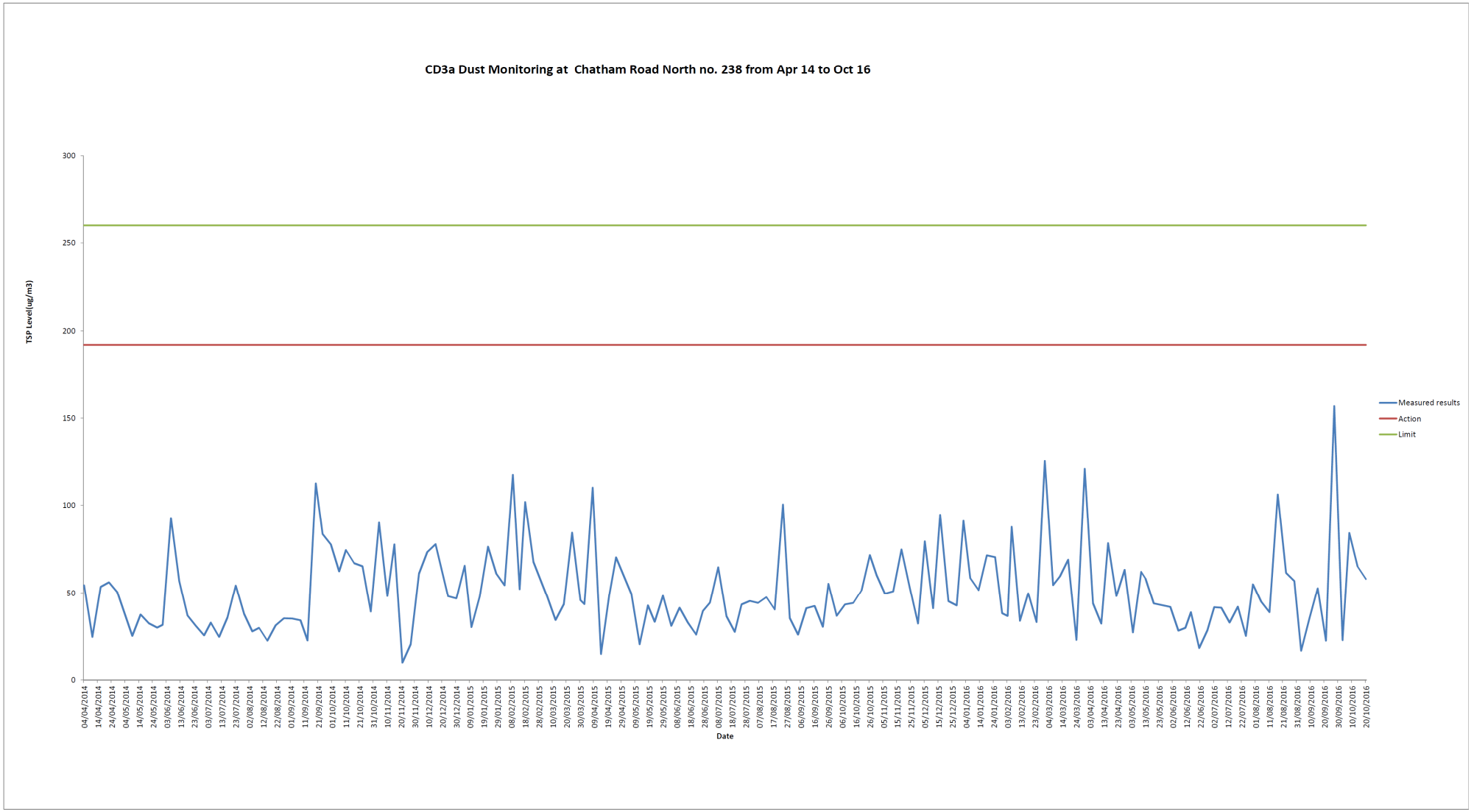


CD2a - PolyU Homantin Student Halls of Residence



CD3a - No. 238 Chatham Road North




CD3a Dust Monitoring at Chatham Road North no. 238 from Apr 14 to Oct 16
TSP Level(ug/m3)
300
250
200
150
100
50
0
Measured results
Action
Limit
Date
04/04/2014
14/04/2014
24/04/2014
04/05/2014
14/05/2014
24/05/2014
03/06/2014
13/06/2014
23/06/2014
03/07/2014
13/07/2014
23/07/2014
02/08/2014
12/08/2014
22/08/2014
01/09/2014
11/09/2014
21/09/2014
01/10/2014
11/10/2014
21/10/2014
31/10/2014
10/11/2014
20/11/2014
30/11/2014
10/12/2014
20/12/2014
30/12/2014
09/01/2015
19/01/2015
29/01/2015
08/02/2015
18/02/2015
28/02/2015
10/03/2015
20/03/2015
30/03/2015
09/04/2015
19/04/2015
29/04/2015
09/05/2015
19/05/2015
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27/08/2015
06/09/2015
16/09/2015
26/09/2015
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16/10/2015
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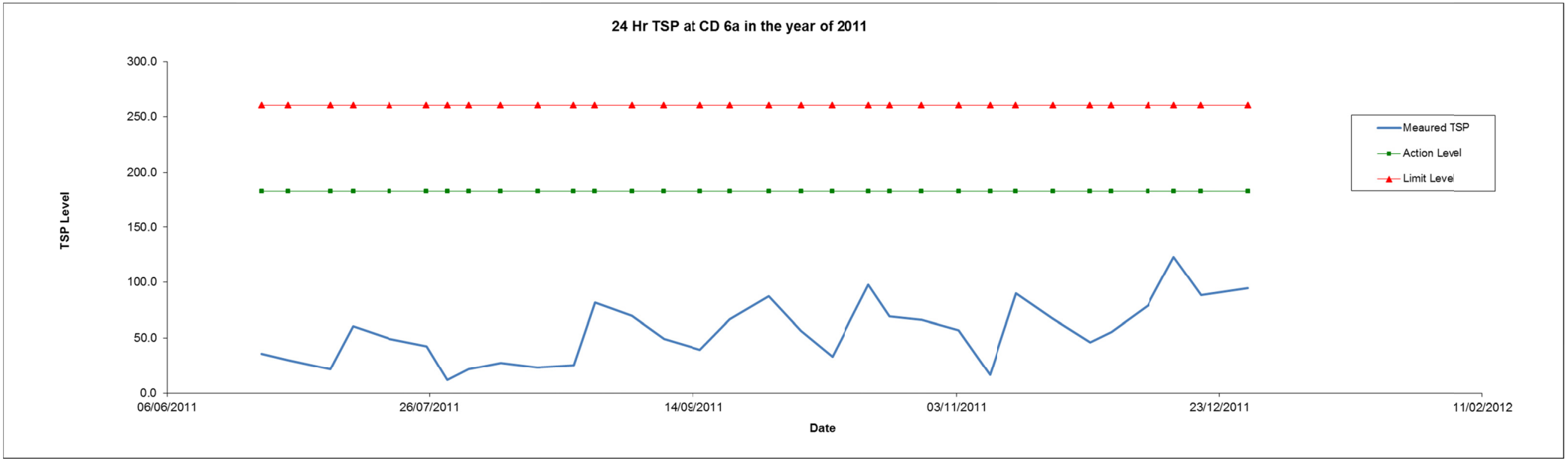
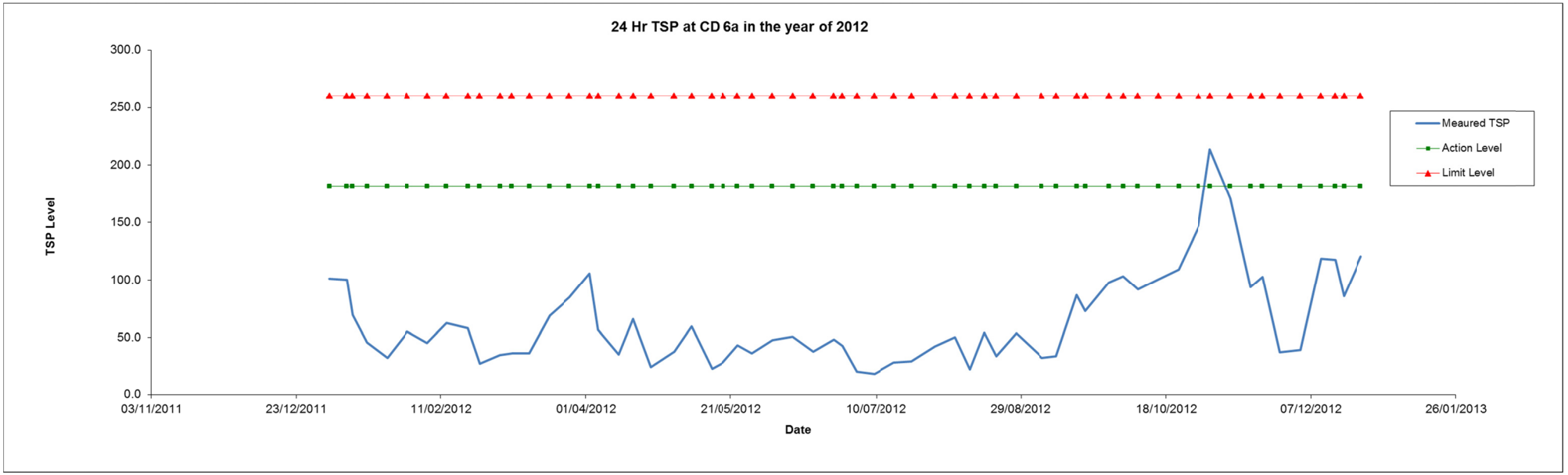
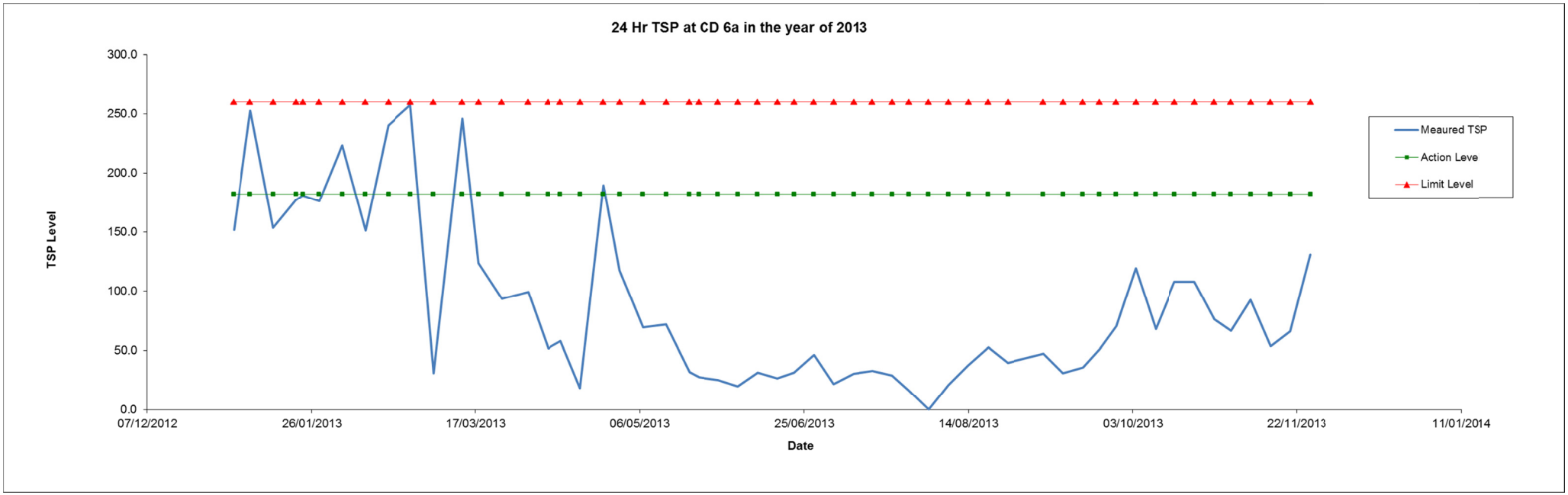
23/04/2016
03/05/2016
13/05/2016
23/05/2016
02/06/2016
12/06/2016
22/06/2016
02/07/2016
12/07/2016
22/07/2016
01/08/2016
11/08/2016
21/08/2016
31/08/2016
10/09/2016
20/09/2016
30/09/2016
10/10/2016
20/10/2016

CD6a - Site boundary of Finger Pier adjacent to Harbourfront Horizon




24 Hr TSP at CD 6a in the year of 2012
TSP Level
300.0
250.0
200.0
150.0
100.0
50.0
0.0
03/11/2011
23/12/2011
11/02/2012
01/04/2012
21/05/2012
10/07/2012
29/08/2012
18/10/2012
07/12/2012
26/01/2013
Date
Meaured TSP
Action Level
Limit Level



Remarks:
Weather Conditions: Typical fine and occasionally raining during the monitoring periods

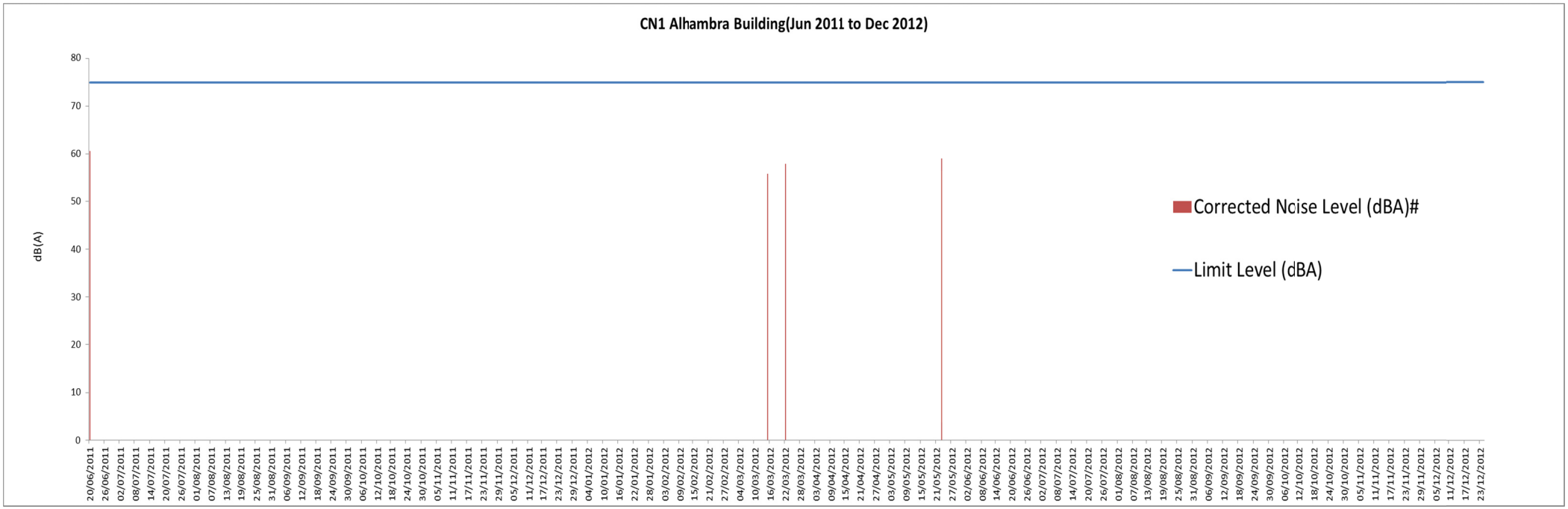
Appendix E

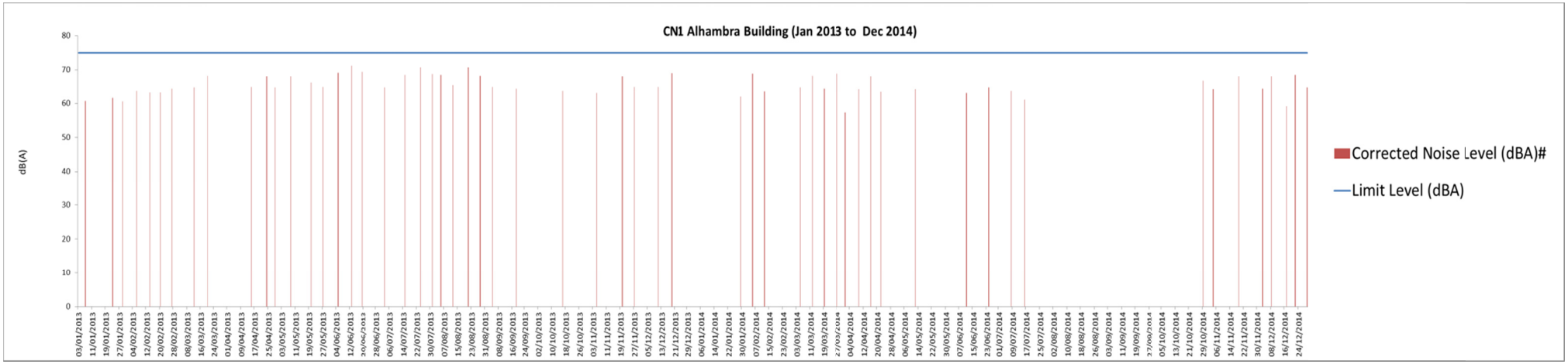
Impact Monitoring Graphical Plots (Impact Noise Monitoring Results)

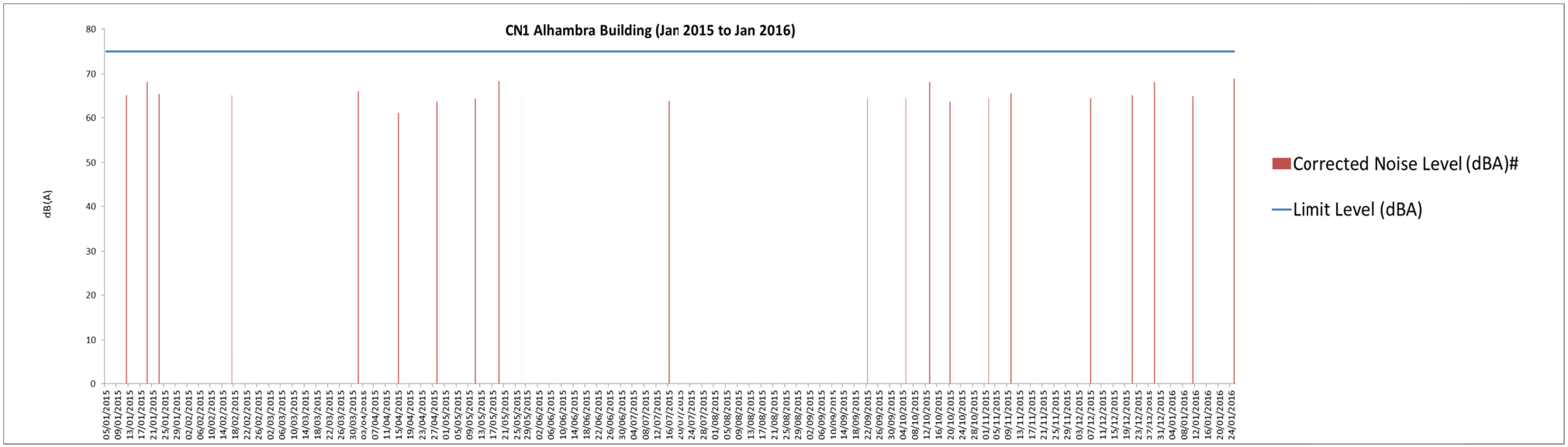
Major activities being carried out at respective construction areas:

Noise Monitoring Points	**Works Areas**		
CN3 - Queen Elizabeth Hospital – Specialist Clinic CN3a - Methodist School	**Wylie Road construction site**	Major Activities:	Period:
		1. Construction shaft excavation and mucking out for tunnel excavation	Aug 2011 to Mar 2015
		2. Ancillary building superstructure	Feb 2015 to Mar 2016
		3. Backfilling of shaft	Mar 2016 to Jun 2016
		4. Reinstatement of site	
CN4 - Yee Fu Building CN4a - PolyU Homantin Student Halls of Residence	**Ho Man Tin Station works site**	Major Activities:	Period:
		1. Surface blasting and excavation	Jun 2011 to Mar 2014
		2. Slab and formation	Feb 2014 to May 2014
		3. Superstructure of HOM station	Apr 2014 to Jun 2015
		4. Building service and E&M works	Jun 2015 to Jun 2016
		5. Slope and backfilling	Jun 2016 to Oct 2016
		6. Landscaping works	
CN1 - Alhambra Building CN2 - Methodist College	**Gascoigne Road Rest Garden works area**	Major Activities:	Period:
		1. Setup of noise enclosure	Jun 2011 to Sep 2011
		2. Tunnel excavation and track works	Sep 2011 to Nov 2015
		3. Reinstatement of site	Nov 2015 to Feb 2016
CN6 - Lok Do Building	**Fat Kwong Street playground works site**	Major Activities:	Period:
		4. Setup of site office	Jun 2011 to Sep 2011
		5. Construction shaft / audit and tunnel excavation	Jun 2011 to Sep 2015
		6. Backfilling of shaft	Sep 2015 to Nov 2015
		7. Reinstatement of site	Jun 2016 to Sep 2016

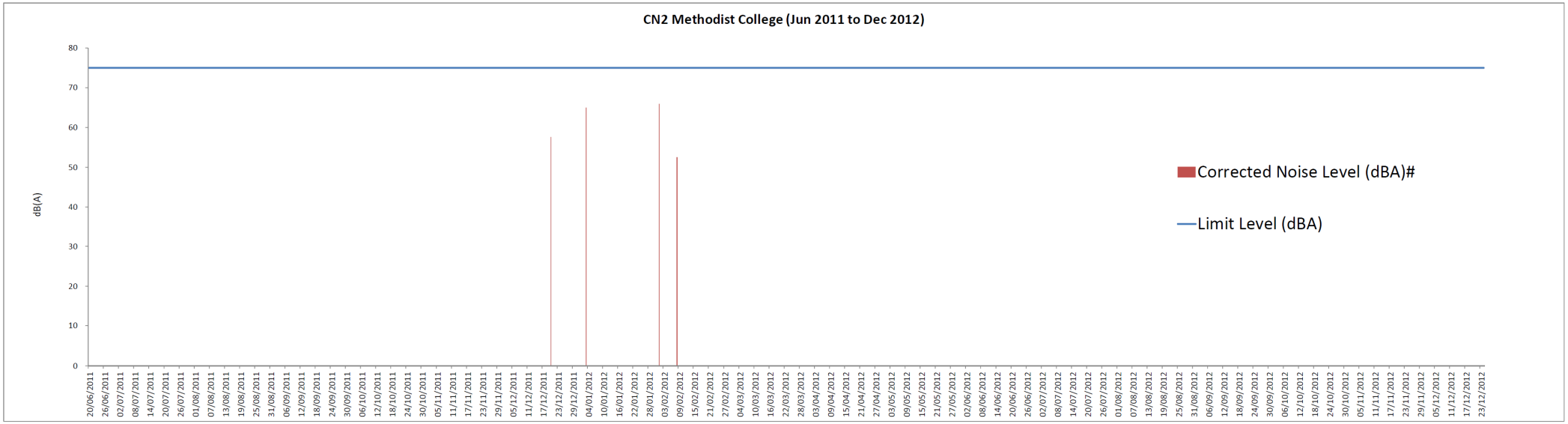
CN1 - Alhambra Building

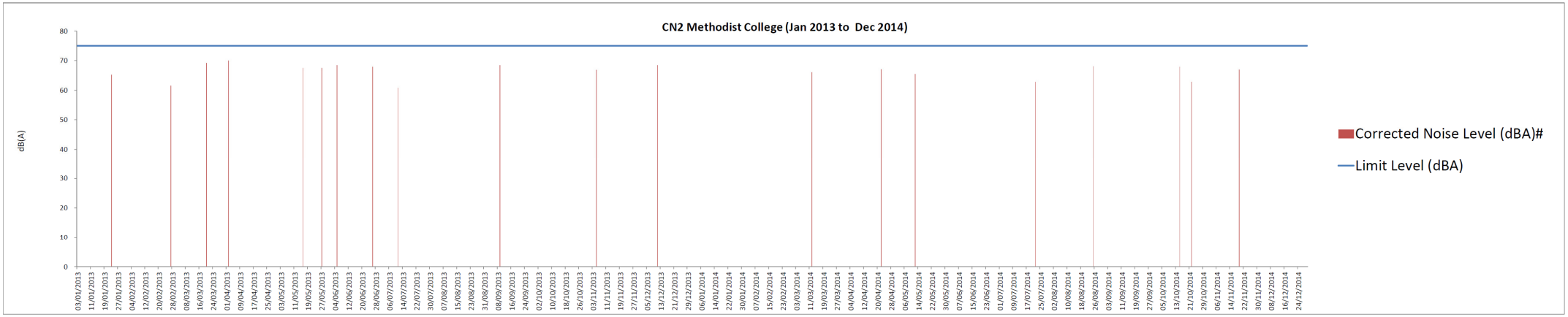


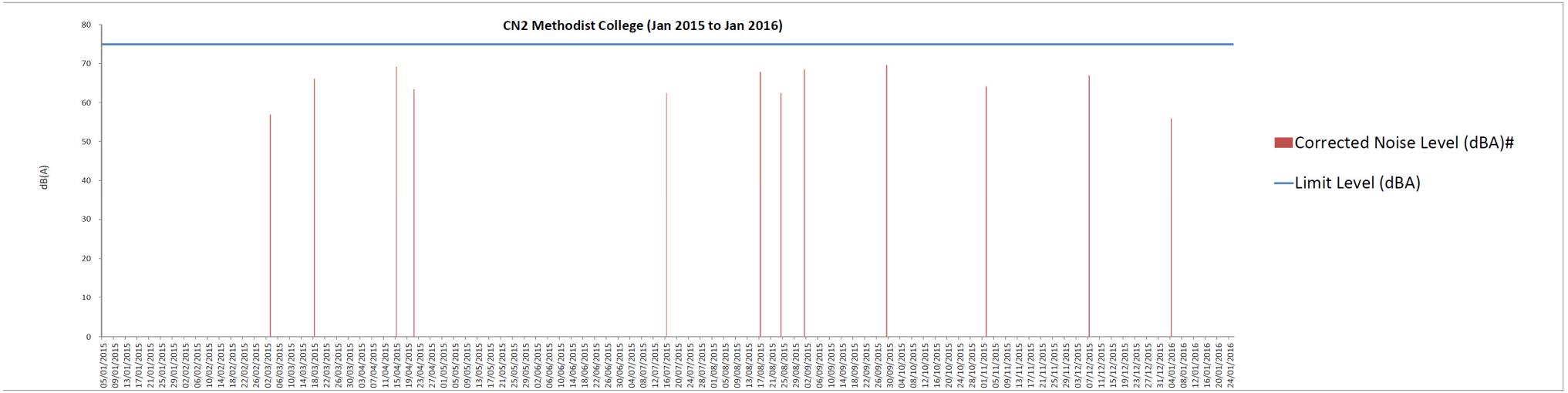

CN1 Alhambra Building (Jan 2013 to Dec 2014)
dB(A)
Corrected Noise Level (dBA)#
Limit Level (dBA)


CN1 Alhambra Building (Jan 2015 to Jan 2016)
dB(A)
Corrected Noise Level (dBA)#
Limit Level (dBA)

CN2 - Methodist College






CN2 Methodist College (Jan 2015 to Jan 2016)
dB(A)
0
10
20
30
40
50
60
70
80
05/01/2015
09/01/2015
13/01/2015
17/01/2015
21/01/2015
25/01/2015
29/01/2015
02/02/2015
06/02/2015
10/02/2015
14/02/2015
18/02/2015
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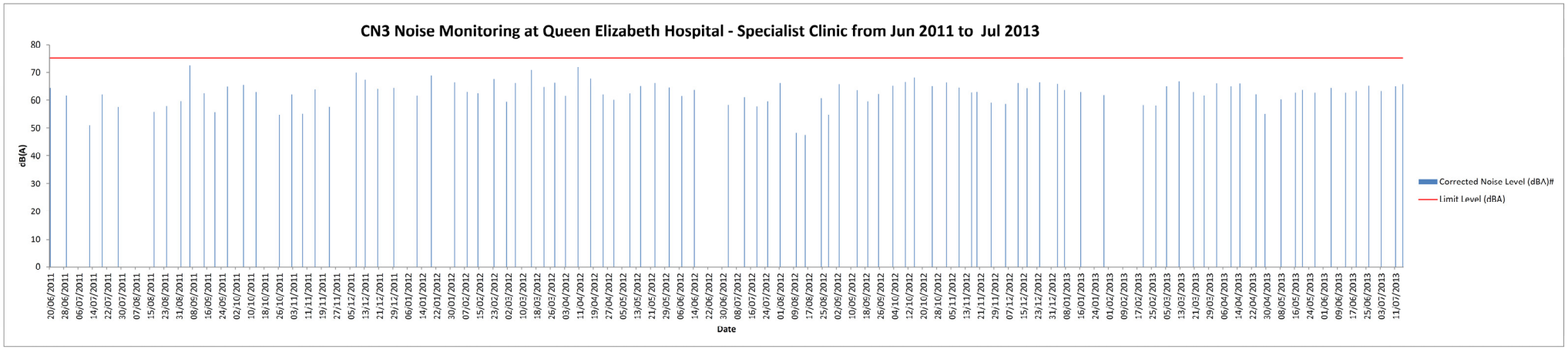
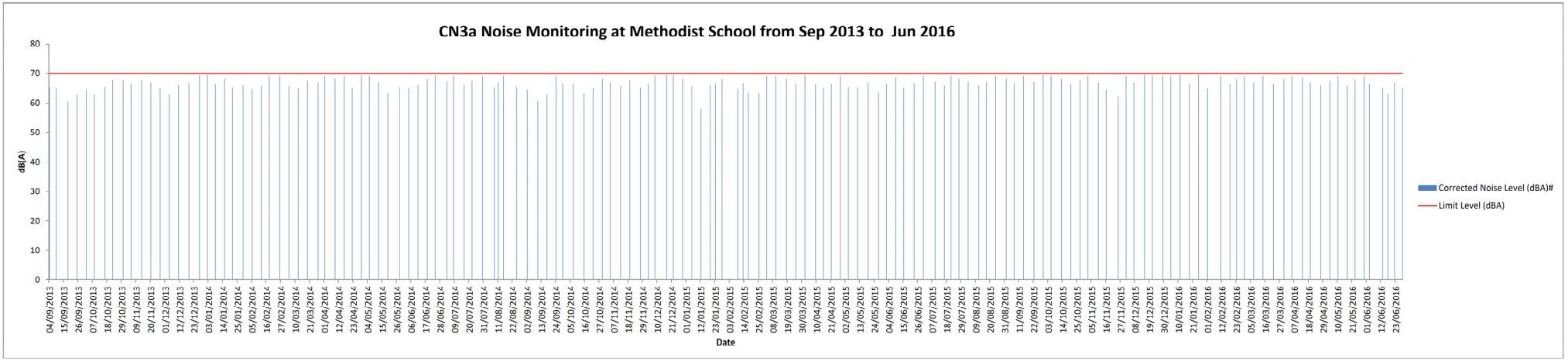
21/11/2015
25/11/2015
29/11/2015
03/12/2015
07/12/2015
11/12/2015
15/12/2015
19/12/2015
23/12/2015
27/12/2015
31/12/2015
04/01/2016
08/01/2016
12/01/2016
16/01/2016
20/01/2016
24/01/2016
Corrected Noise Level (dBA)#
Limit Level (dBA)

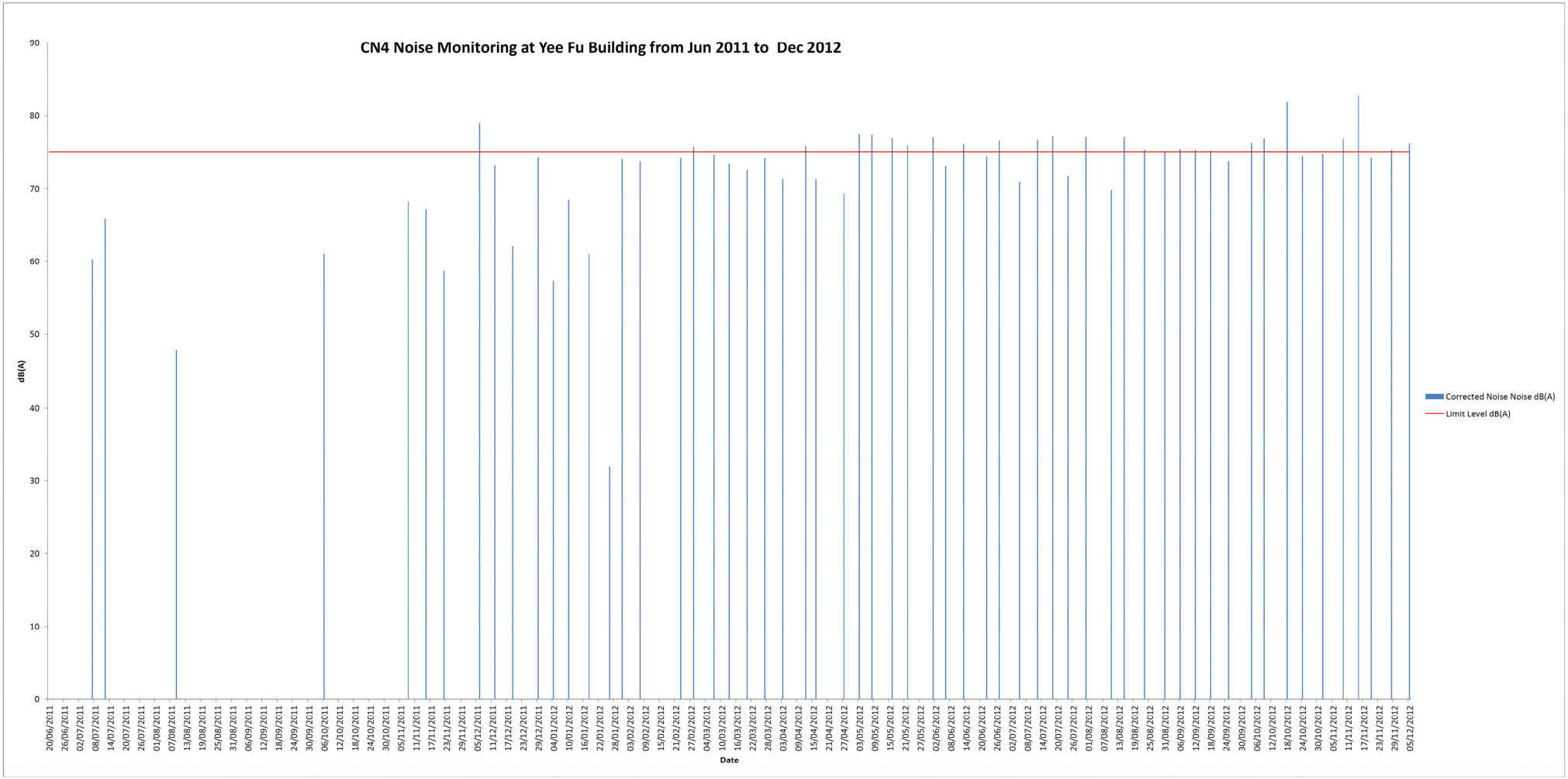
CN3 - Queen Elizabeth Hospital – Specialist Clinic



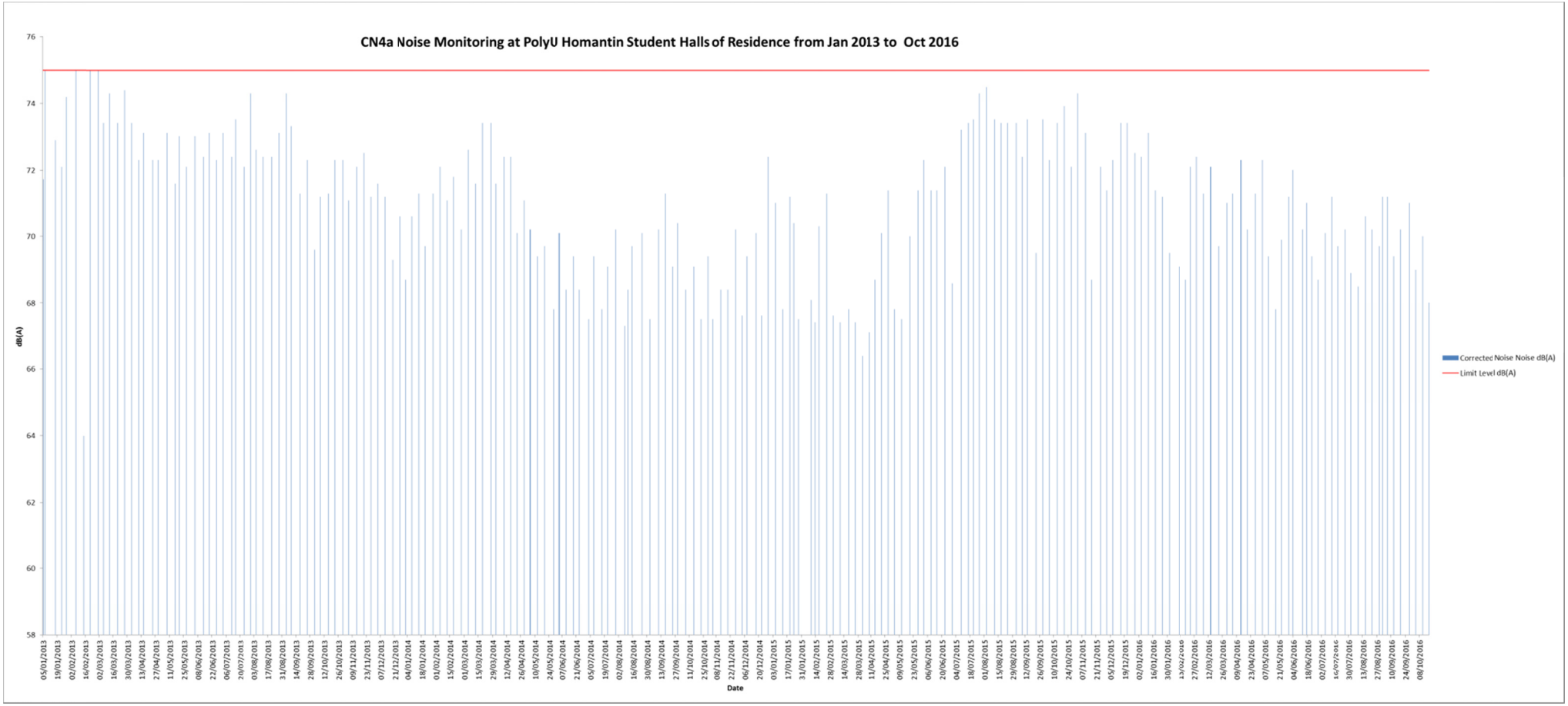
CN3a - Methodist School



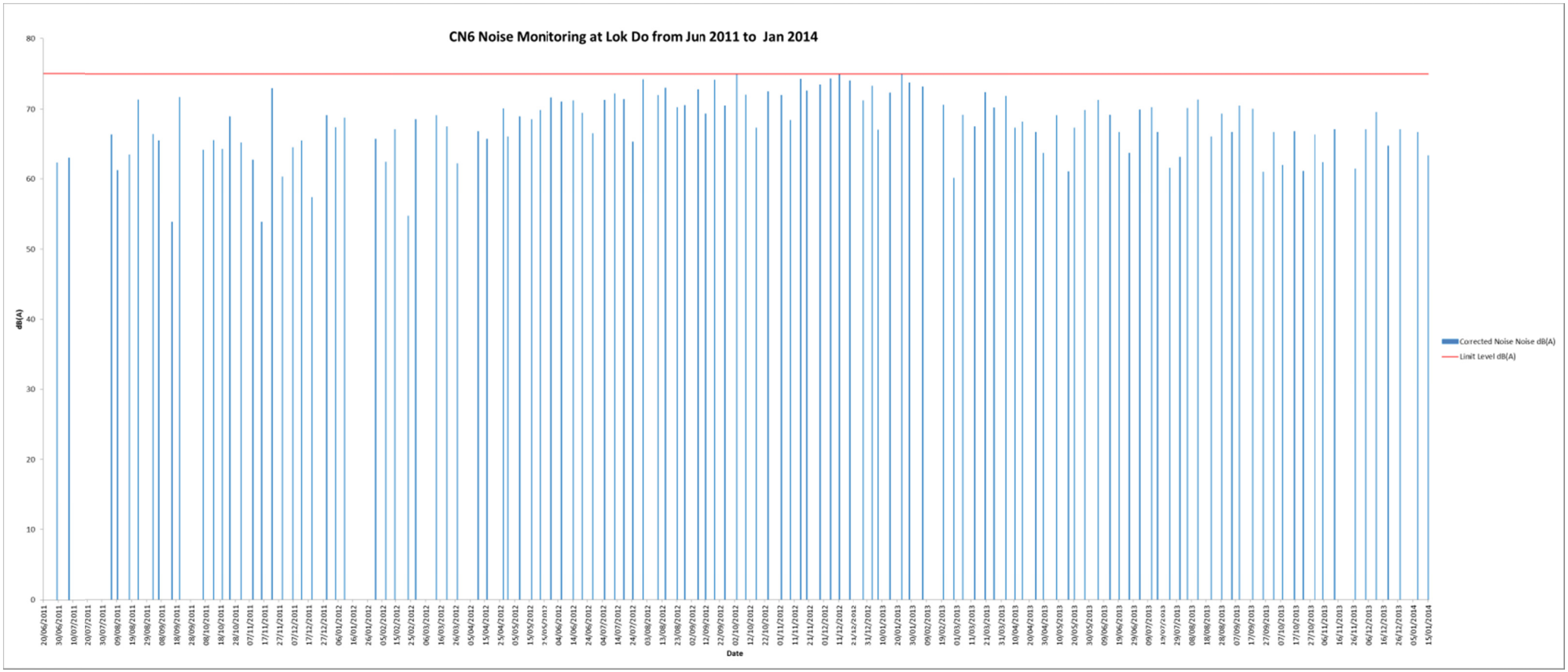
CN4 - Yee Fu Building

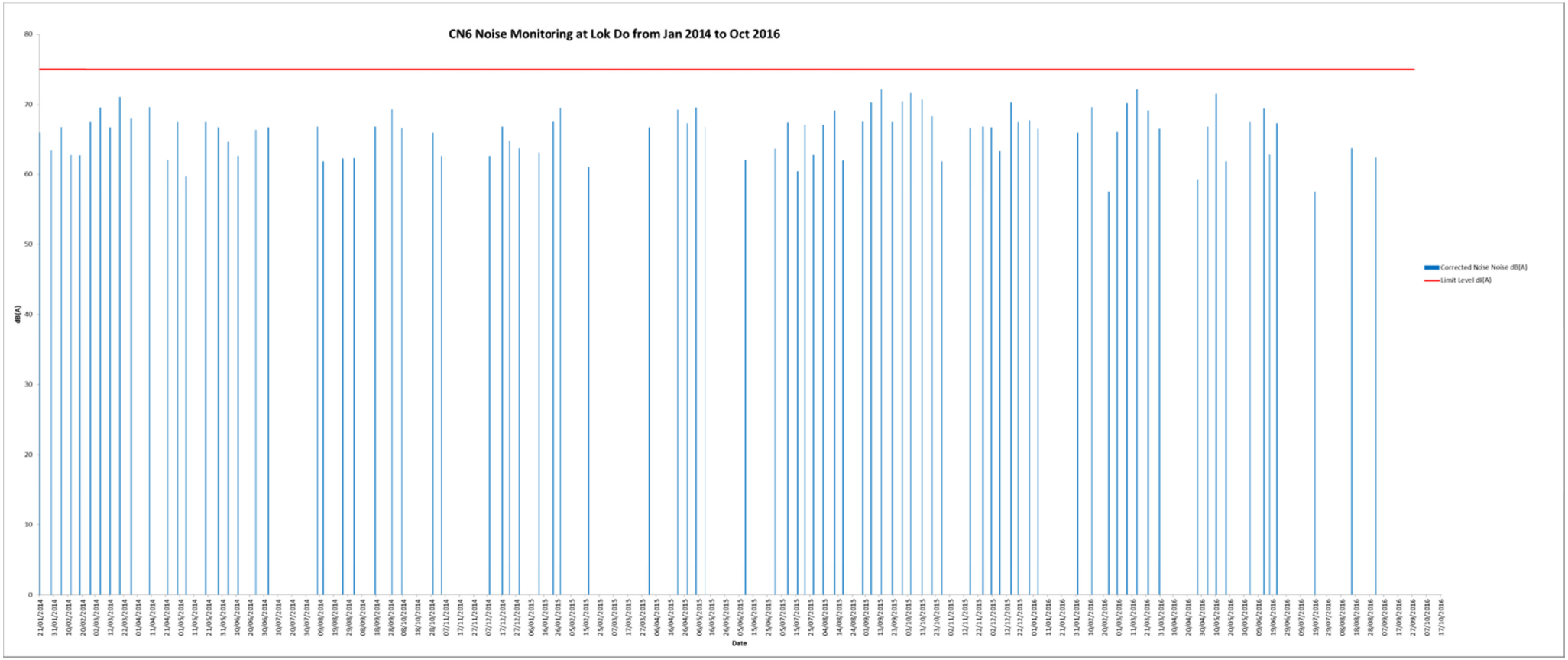


CN4a - PolyU Homantin Student Halls of Residence



CN6 - Lok Do Building




CN6 Noise Monitoring at Lok Do from Jan 2014 to Oct 2016
dB(A)
Date
Corrected Noise Noise dB(A)
Limit Level dB(A)